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August 1986 A CWC/I Publication

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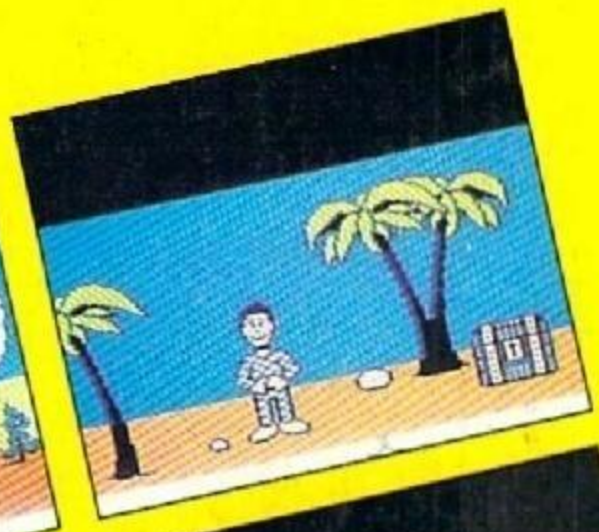

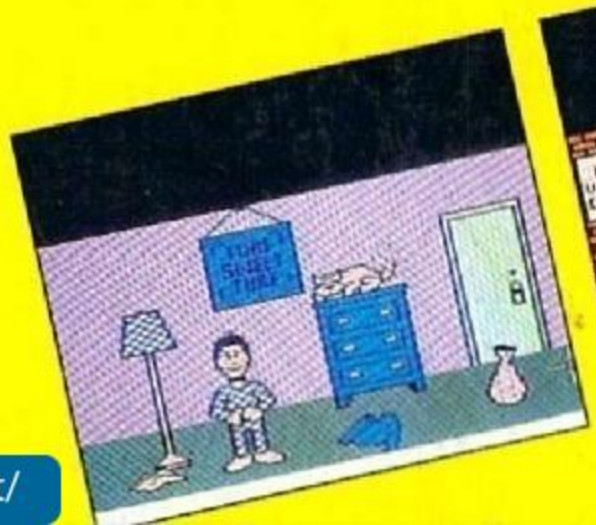

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If you own a C-64, you

The one you purchased. And the

GEOS realizes the technical potential that has been in the C-64 all along. Speed. Power. Ease of use. Sophistication. Elegant, practical applications you might expect of a high-end personal computer, all made possible with GEOS. It's so simple—but then, so was fire. Once it caught on.

To begin at the beginning. **GEOS** stands for **GRAPHIC ENVIRONMENT OPERATING SYSTEM.** Why?

GRAPHIC: Because menus and icons replace long, typed command lines. Point and click, that's it.

ENVIRONMENT: Because GEOS provides a consistent, powerful way to use your computer. Learning new applications is a snap (or should we say click).

OPERATING SYSTEM: Because GEOS orchestrates every function so that they all work together systematically, even symphonically.

Some basics. Icons are graphic images which represent files or utilities. Each is different, and all are easy to recognize and easy to use.

A menu is just that: a list of functions available for selection. When a menu appears, move the pointer to any item you wish. Click. Click. You're on your way.

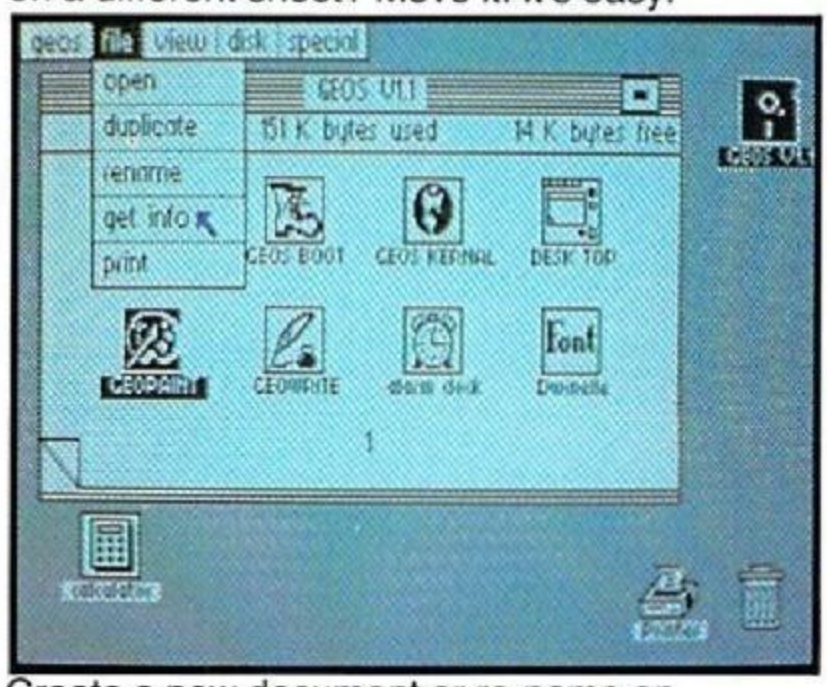
A pointer is used to select and activate items. To move the pointer, roll the mouse or trackball or rotate the joystick. Once on target, click once to select; click a second time to activate.

Fonts are a new way of looking at text. Choose from 5 different fonts (with more on the way). Try Dwinelle, or Roma, **bold,** or *italics,* even underline and outline. Need to fit more words on a line? Pick a smaller point size, like University 6 point, and get over one hundred characters per line.

All this and fast too. Because the integrated diskTurbo software improves 1541 disk drive performance 5 to 7 times. That's right. On both reads and writes.

GEOS can be divided into 4 areas: two functional aspects (deskTop and Desk Accessories), and two major applications (geoPaint and geoWrite).

deskTop. deskTop is a graphic interface, making file organization and management easy. As always, you call the shots. Load a disk. Files appear as icons on the disk notepad; to flip through, point at the folded corner and click. Prefer a file appear on a different sheet? Move it. It's easy.



Create a new document or re-name an existing one. Want to copy a file onto the same or a different disk? Fine. Forgotten what a file contains? Select "get info" from the file menu. A description of that file's contents appears. Finished with a file? Print it. Save it. Or drop it in the trash and have done with it. Your call.

geoPaint. A full-featured, color graphics workshop at your fingertips. The pointer operates any one of the fourteen graphic tools and shapes in the drawing menu. Create masterpieces on the Drawing Window. By turns, use a pencil, an airbrush or a paint brush, each with a character all its own. Draw straight lines, squares, rectangles or circles. Fill in with any of the 32 patterns. Switch to pixel-mode, where each dot in a selected section is magnified many times its size for easy manipulation.

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own two Machines.

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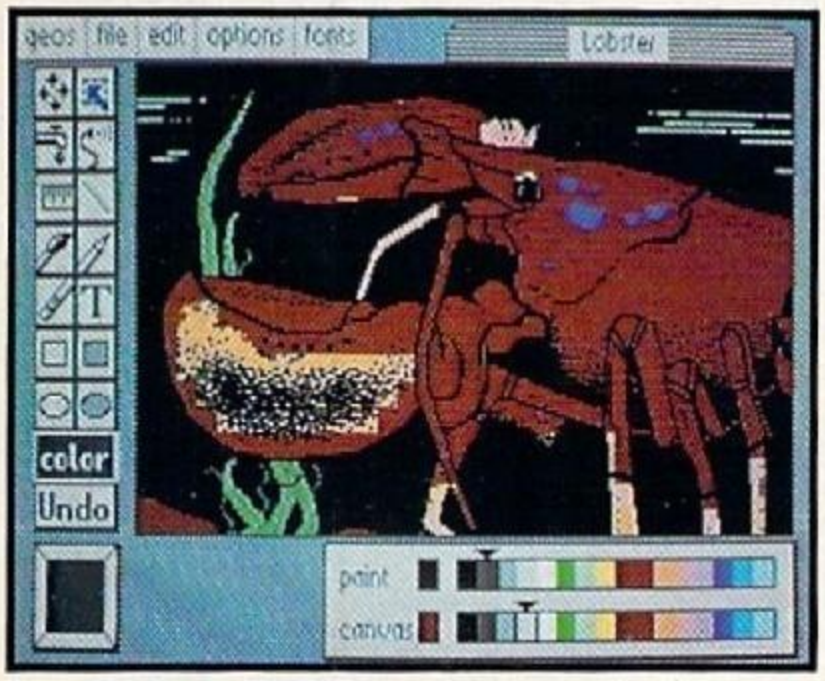
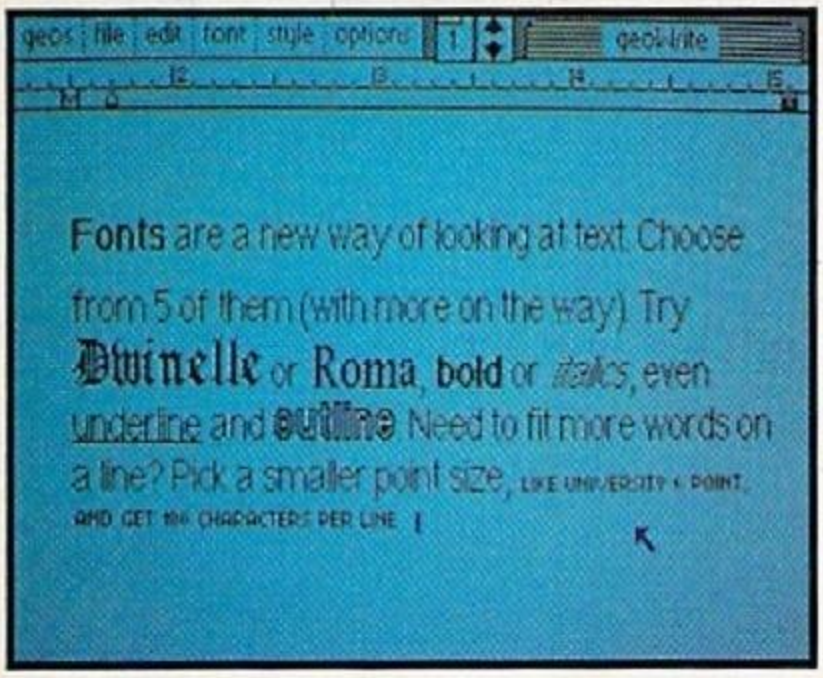


Second thoughts? Erase what you don't want. Or "UNDO" your last act. (If only life could imitate art!)

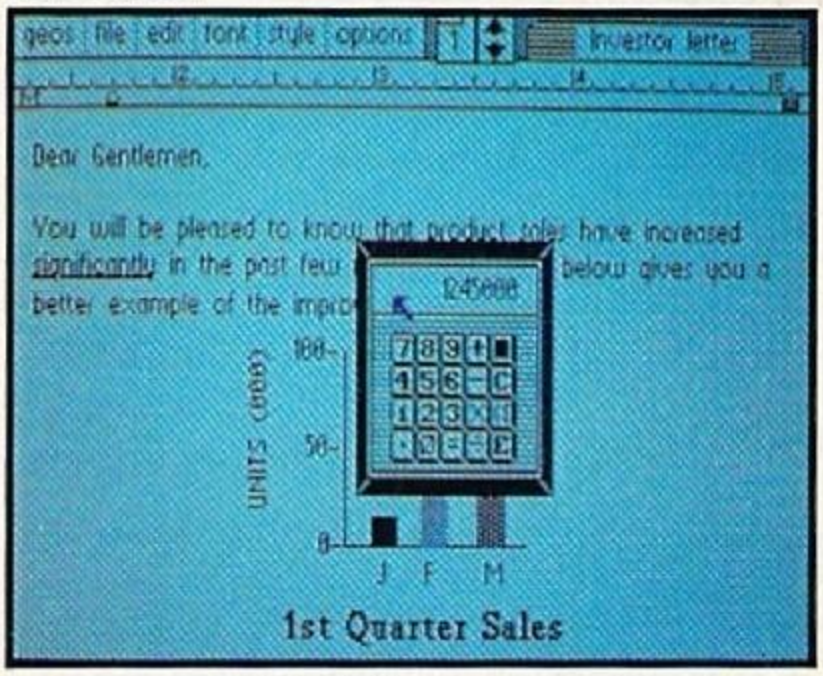
Add text if you like, in different fonts, styles or point sizes. Even change its position or layout at will.

Move or copy any part of your creation. Once done, you can include your artwork in another document—a letter home perhaps. (Won't Mother be pleased?) GEOS makes it easy.


geos | file | edit | font | style | options
geoWrite
Fonts are a new way of looking at text. Choose
from 5 of them (with more on the way). Try
Dwinelle or Roma, bold or italics, even
underline and outline. Need to fit more words on
a line? Pick a smaller point size,

geoWrite. An easy to use, "what you see is what you get" word processor. Create documents. Insert, copy, move or delete text as you wish. Choose from 5 different fonts in many different styles and point sizes. Preview your page exactly as it will appear off the printer. Typists will appreciate tabs, word-wrap and page breaks.

Documents may contain up to 64 pages. What's more, you can move to any page instantly. If you like, you can cut selected text from one section and move or copy it to another. Add graphics from geoPaint. It's a cinch.



Desk Accessories. Handy programs you can use while in any GEOS application. These include an alarm clock, a notepad for reminders, a four-function calculator, and photo and text albums which store pictures and phrases you may then paste into applications. The Preference Manager even lets you establish parameters for everything from mouse speed to the date and time—even background color. Civilized options, every one.

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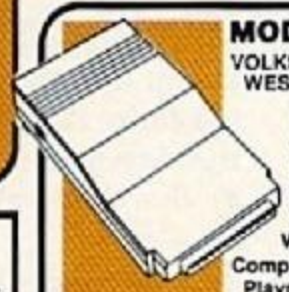

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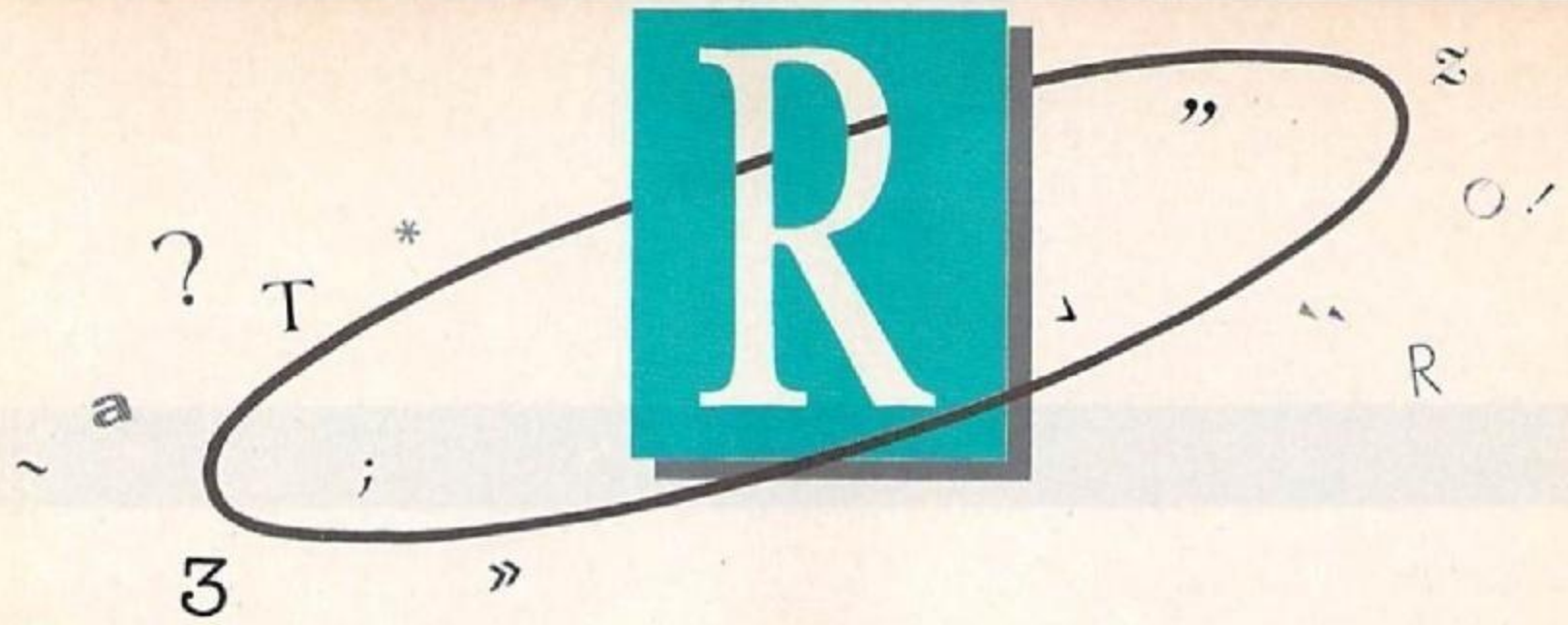

Discover ReRUN

No one has ever accused the computer publishing industry of being a democracy, and yet, readers do have a strong voice in determining the editorial content of *RUN*.

Through surveys, questionnaires and other written and verbal communication, we attempt to keep our fingers on the pulsebeat of our audience to determine whether or not we're addressing our readers' needs and interests.

This editorial, for instance, is written in response to a recent readers' questionnaire in which we queried our readers about ReRUN. The usefulness of ReRUN is well-documented; however, a surprising number of our readers are apparently not familiar with ReRUN.

Since the inception of *RUN*, there has been a demand for our published programs to be offered on magnetic media. In response to these requests from our readers, ReRUN was born.

This saves you, the reader, countless hours of typing time. Otherwise, for many of you, there would be no other means for you to use and enjoy such recent top-quality (albeit, long) programs as RUN Script, Runterm Plus and Ultra Hi-Res.

ReRUN eliminates the tedium involved in entering program listings from the magazine. It also eliminates the risk of entry error. All of the programs have been thoroughly tested, so you can boot up and enjoy these ready-to-run programs in minutes.

At the beginning of this year, we introduced an improved version of ReRUN, which now features every program published in the magazine in a bimonthly format. ReRUN is available at a yearly subscription rate, and each disk is accompanied by a helpful documentation booklet.

Although we're not in the software publishing business (ReRUN is, after all, a service to our readers), we've also published several special theme-related disks that our readers have found extremely useful. (The GamePak and Productivity Pak premiered in 1985, and Productivity Pak II is slated for later this year.)

As an extra attraction, ReRUN also features never-before-published bonus programs. Each disk is also conveniently menu-driven, which allows you to simply press a key to automatically load and run the indicated program.

ReRUN features useful programs in the areas of home applications, utilities, business applications, finance and education. The careful testing of each program assures you that it will run on your system, whether you're a C-64 or C-128 owner.

If you haven't tried ReRUN yet, you owe it to yourself to experience the joy and ease of using quality programs without keyboarding and programming headaches.

To order the latest ReRUN (or any previous edition), contact Debbie Bourgault, ReRUN, 80 Pine St., Peterborough, NH 03458, or see the ad in this issue (p. 48).

Second Annual RUNaway

Like Christmas, spring and the World Series, the Great RUNaway contest is a yearly event well worth waiting for.

And this year your chances of winning this one-of-a-kind giveaway have increased dramatically! (They're certainly better than your odds of winning your state lottery.)

We will select 20 winners who will share in over $20,000 worth of accessories, hardware and software for your Commodore computer.

Major manufacturers have contributed Commodore computer systems, peripherals such as printers and modems, books, learning aids, accessories and, of course, tons of software for every computer application imaginable.

Entering this contest couldn't be easier. No purchase or entry fee is required. Simply fill out the entry form (see p. 31), enclose it in an envelope and send it to:

The Second Annual Great RUNaway
80 Pine St.
Peterborough NH 03458

Entries must be received by October 31, 1986.

This is an opportunity you can't afford to pass up.

db

New Bulletin Board Number

The *RUN* technical and editorial offices changed locations last winter, necessitating new phone lines and a new phone number for the RUNning Board. We invite you to give us a call at the new number, 603-924-9704, to find out the latest information about *RUN* magazine and the Commodore industry.

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Hints and tips for Commodore users

Magic is the original *column of reader-submitted hints and tips. Each month we present brief, useful computer "tricks" to help you get the most out of your Commodore computing system—whether you're a beginning or advanced computerist, a C-64 or C-128 owner. Magic is a forum for* RUN*'s imaginative and inventive readers to share their programming tips, brief software or hardware modifications, shortcuts or items of general interest. If you have an idea to make computing easier, faster, more exciting and enjoyable, send it to:*

Magic
RUN *Magazine*
80 Pine St.
Peterborough, NH 03458

Beginning with the August issue, if your trick is accepted for publication in the column, you will receive a colorful RUN Magic T-shirt.

From the end of the world to your town come fantastic tricks to captain your Commodore. Your screen flickers, flashes and sparkles, rivaling nature's August light shows, and music gallops on hot trade winds. A gray-brown mouse scampers across your desk, masquerading as a joystick. Salvation, elevation, gyration and admiration make up the magical summer playground.

$30E Commodore 1350 mighty mouse joystick—The only programs designed so far for the Commodore's new mouse are the Jane series of applications software. But don't fret! The rapid rodent performs quite capably as a joystick (the left button acts as a fire-button) on several C-64 favorites such as Doodle!, Micro Illustrator, the Graphic Editor in The Print Shop and even on GEOS.

It may take a while to become accustomed to using the mouse, but once you get the hang of it, you won't want to go back to using a joystick for these programs. Also try the mouse on other programs that require a joystick.

Warren D. Lee
Dayton, OH

$30F C-64 shorter sorter—I believe this to be the world's fastest Basic number-sorter. I challenge you magician's apprentices—even you Houdinis!—to come up with a faster sorter. My benchmark program first prints a list of 100 random numbers in the range 1–100 and then prints the sorted version of the numbers in less than eight seconds.

```
Ø REM C64 SHORTER SORTER
1 TI$="ØØØØØØ":DIMB(1ØØ):PRINT"{SHFT CLR}{C
  TRL 2)";:A=RND(-TI):C=1:D=1ØØ
2 FORI=CTOD:A=INT(RND(C)*D)+C:PRINTA;:B(A)=
  B(A)+C:NEXT:PRINT:PRINT"{CRSR DN}":FORI=C
  TOD
3 IFB(I)=.THENNEXT:PRINT:PRINT"{CRSR DN}TIM
  E ="TI/6Ø"SEC":WAIT198,1:END
4 PRINTI;:B(I)=B(I)-C:GOTO3
```

James F. McConnell
Marathon, NY

$310 Mouse tracks—The 1350 Mouse works best on a clean, smooth surface. Unfortunately, computer desks aren't always clean or smooth. Rather than buy an expensive pad for your mouse to run on, mouse out a plain plastic placemat for about a dollar or liberate one from the kitchen. It's larger than most mouse pads, so you don't have to pick up your mouse as often. It can be easily cut to match the workspace around your computer, and it's easy to wash.

Warren D. Lee
Dayton, OH

$311 C-64 star track—This program will supply an interesting background for a space adventure. You can Poke normal or customized characters for the desired effect.

To speed up the stars, add Print commands to the end of line 20. To change characters, substitute other numbers, such as 34, 42, 43 and 58, for 46 in line 30.

```
10 REM Scrolling stars
20 POKE53280,0:POKE53281,0:X = INT(RND(1)*40):PRINT
30 POKE56256 + X,1:POKE1984 + X,46:GOTO20
```

Fred Buike
Madison Heights, MI

$312 C-64 multiple elevators—Here's a neat little trick for the C-64. Hope you like it!

```
1 REM C64 MULTIPLE ELEVATORS
1Ø PRINT"{SHFT CLR}"
2Ø POKE 22Ø,234
```


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```
3Ø PRINT"MULTIPLE ELEVATORS"
4Ø GOTO 3Ø
```

Tim Dunn
Edgewood, KY

$313 Last-disk effort—If one of your disks containing valuable data has been rendered useless because of a warped jacket or spilt liquid, don't despair—all may not be lost.

Carefully slit open the wrecked protective jacket and remove the good Mylar disk. Be sure not to touch the recording surface.

Scrounge up an old disk that has a good jacket. Remove the disk from this jacket and insert the disk to be salvaged. Now, resecure the jacket with tape. Then, try initializing the disk (not formatting). If you can't initialize it, turn the disk over; you may have put the wrong side up. If it initializes, make a backup copy immediately and you're all set. If it still doesn't initialize, at least you tried.

Joseph R. Charnetski
Dallas, PA

$314 C-64 Commo-strobe—This program emulates a strobe light, which allows you to photograph moving objects that you cannot normally see with the naked eye, such as the rapidly spinning blades of a ceiling fan.

When the program prompts you for a delay value, enter a number. The larger the number, the longer the time between flashes.

Pressing the F key while the program is running will flash the light more rapidly, and pressing S will flash the light less rapidly. Pressing P gives you the current flashing frequency and will ask you for comments. Pressing C allows you to reset the delay.

```
5 REM C64 STROBE LIGHT
1Ø PRINT "{SHFT CLR}":PRINT "{CTRL 4}":OPEN
   3,4
2Ø INPUT "DELAY";A
3Ø POKE 5328Ø,Ø:POKE 53281,Ø
4Ø FOR I=1 TO A:NEXT I
5Ø POKE 5328Ø,1:POKE 53281,1
6Ø FOR I=1 TO A:NEXT I
7Ø GET A$:IF A$="" THEN GOTO 3Ø
8Ø IF A$="S" THEN A=A+1
9Ø IF A$="F" THEN A=A-1
1ØØ IF A$="P" THEN PRINT#3,"DELAY- ";A:POKE
    53281,6:INPUT "COMMENTS";B$
11Ø IF A$="P" THEN PRINT#3,B$
12Ø IF A$="C" THEN INPUT "NEW DELAY";A
3ØØ PRINT "{SHFT CLR}":PRINT "DELAY-";A:GOT
   O 3Ø
```

Darren Keith Bolding
Friendswood, TX

$315 1670 modem auto-answer—An annoying quirk of the 1670 modem is that it will answer all incoming calls when the computer is on. This makes it hard on your friends' ears when they try to call you.

A solution is to buy the Ring Controller from Radio Shack (part #43-127) for $7.95. It's a replacement modem cord that connects the "line" connection of the modem with the wall jack. The cord has a switch box that lets you switch off the modem so that it won't detect the phone's ring. Be sure to plug the shorter end of this new cord into the modem and the longer end into the wall. Otherwise, it won't work.

David Dumas
Grovetown, GA

$316 Crybaby's reward—A special sound effect for a losing game player or an incorrect trivia answer can enliven your programs. Try it on your C-64. Then use it with a Gosub.

```
1 REM C64 CRY BABY'S REWARD
1Ø1Ø POKE54296,15: POKE54295,Ø
1Ø2Ø R=54272: POKER+6,24Ø
1Ø3Ø POKER+1,4: POKER+5,Ø: POKER+4,33
1Ø4Ø FOR Z=1Ø24 TO 512 STEP-8
1Ø5Ø POKER+1,Z/256: POKER,Z AND 255
1Ø6Ø NEXT Z
1Ø7Ø POKER+4,Ø
1Ø8Ø REM RETURN
```

W. Stuart Sewell
Asheville, NC

$317 Commodore kudos—Ever wonder who are the real wizards whose magic lets you perform all those amazing tricks on your C-128? Enter the following incantation on your screen and press the return key to find out.

```
SYS32800,123,45,6
```

You will also see a bit of advice we would all do well to follow.

Daniel Miller
Astoria, NY

$318 Easy on, easy off—As most 1541 or 1571 disk drive users know, the on/off switch at the back of the drive is inconveniently located. Fortunately, you can solve this problem by connecting the drive to a remote-control extension cord, available in hardware stores for about $5.

The cord has its own on/off switch. Plug the extension cord into a power source, plug the drive's power cord into the extension cord, depress the drive's switch and leave it in the on position. Thereafter, control the drive's power with the extension cord's switch. It's inexpensive, easy to hook up, and it really works.

William Lees
San Francisco, CA

$319 1571 disk drive magic—Did you know your 1571 can format and access both sides of a disk with a C-64 or C-128 in C-64 mode? Here's the magical command:

```
OPEN 15,8,15:PRINT# 15, "U0>M1":CLOSE15
```

If you format a disk after sending this command, the 1571 will format both sides and give you 1328 blocks of storage per disk.

If you cannot access a disk that was formatted on a third-

Continued on p. 76.

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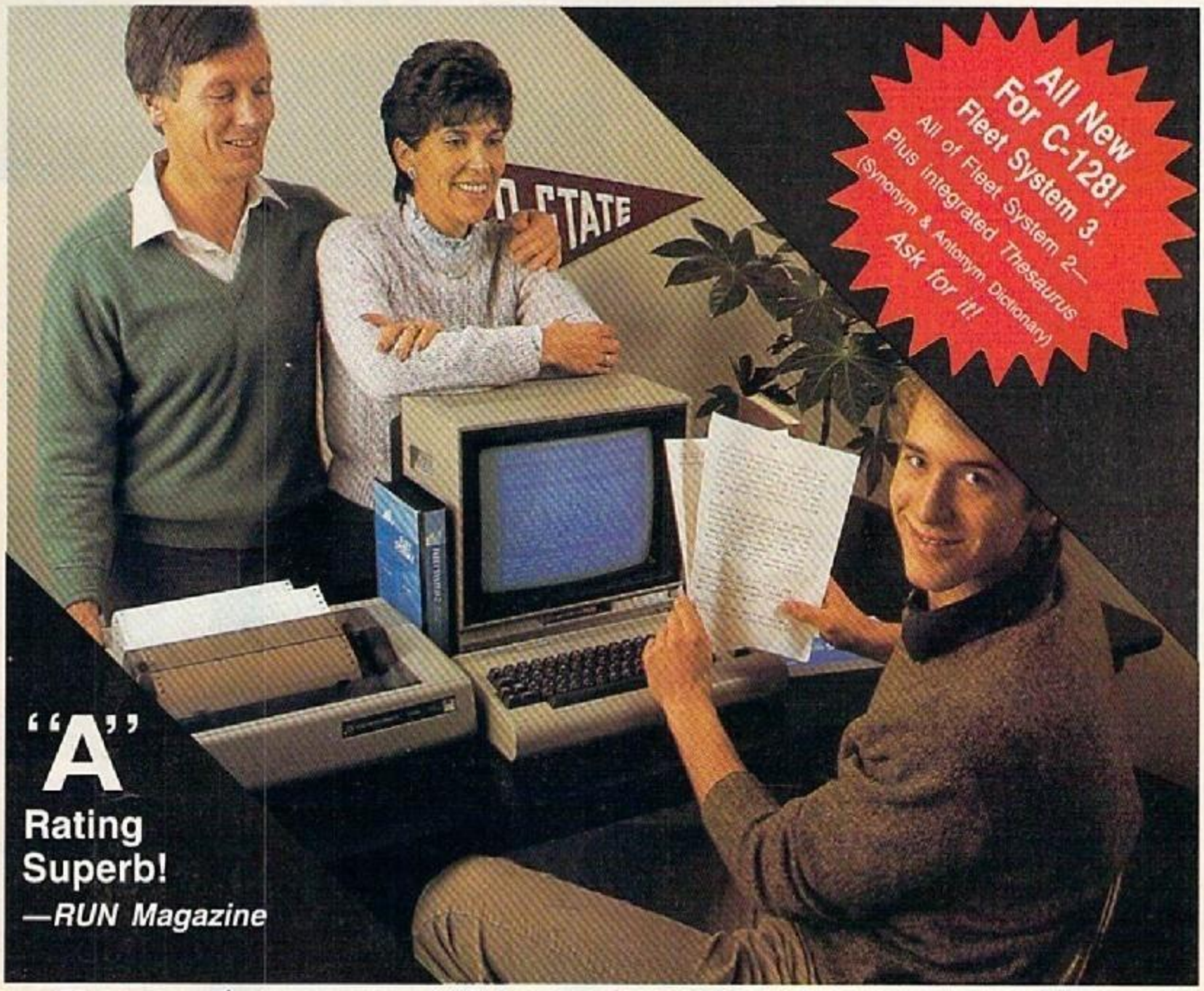

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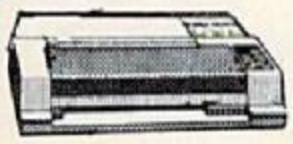

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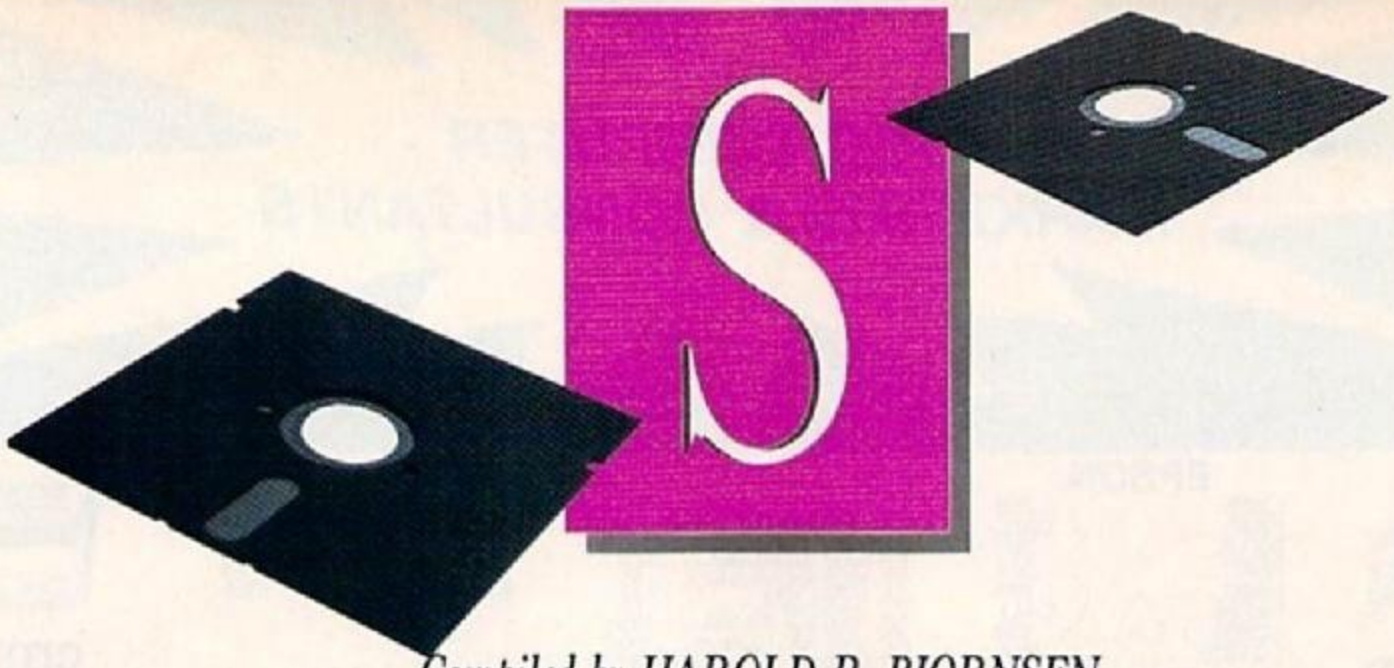

Compiled by HAROLD R. BJORNSEN

Grover's Animal Adventures

B

The World's a Zoo For Your Preschooler to Explore and Learn From

Although CBS Software has discontinued development of new entertainment software, it continues to produce some of the most entertaining educational titles available. One recent release for the C-64, Grover's Animal Adventures, is designed to help preschoolers learn about nature by exploring four different natural environments. From the main menu, you use a joystick to select the African grasslands, a North American forest, the Atlantic Ocean or a North American barnyard.

Each environment is a colorful, but bare, outdoor stage, which you can decorate with a wide variety of animals, plants, rocks, logs, shells and clouds. Each scene includes Sesame Street's lovable, furry old Grover and a box at the lower right of the screen where you can preview plants and animals before adding them to the scene. Like all of the creatures and objects in the program, Grover can be moved around and placed anywhere on the screen. Once Grover's in place, simply press the fire-button, and the cursor jumps back to the selection box.

Use the function keys to examine the available plants and animals, to erase a single object that's already been added to the screen or to clear the entire scene and start over. As with most of their preschool titles, CBS has thoughtfully included a function key template, which is placed directly on the keyboard to help a child remember which keys control what functions. (The template is designed for the C-64 function keys, so you cannot use it with the C-128.)

Each of the four natural environments comes with its own collection of about eighteen different animals, which can be moved from the selection box to the scene. As an animal is moved across the screen, it springs to life with animation. Birds flap their wings, fish swim and land animals walk appropriately. Although an animal can be moved around the entire screen, it can be released only in a location suitable to its mode of travel. You cannot, for example, place fish in the sky or birds in the water. If an animal is placed in an inappropriate spot, a warning buzzer sounds and the animal must be placed elsewhere. Appropriate positioning is rewarded with a short musical fanfare or a satisfying splash (when, for example, you release a fish into the water).

Because Grover's Animal Adventures lets you explore four totally different environments, it includes many unusual and fascinating animals. In addition to bears, horses, cats and ducks, the program also includes gazelles, opossums, squid, baboons and African egrets. As each animal is previewed in the selection box, its name appears below. In addition, all of Grover's animal friends are pictured in the game's instruction manual along with short descriptions and several suggested activities. *(CBS Software, One Fawcett Place, Greenwich, CT 06836. C-64/$14.95 disk.)*

Bob Guerra
Charlestown, MA

Report Card

A ***Superb!*** An exceptional program that outshines all others.

B ***Very Good.*** One of the better programs available in its category. A worthy addition to your software library.

C ***Good.*** Lives up to its billing. No hassles, headaches or disappointments here.

D ***Mediocre.*** There are some problems with this program. There are better on the market.

E ***Poor.*** Substandard, with many problems. Should be deepsixed!

Superscript

A

A Mighty Word Processor For the Commodore 128 Is at Your Fingertips

Superscript is a powerful, full-featured program that handles almost any word processing task. It has a built-in spelling checker and the

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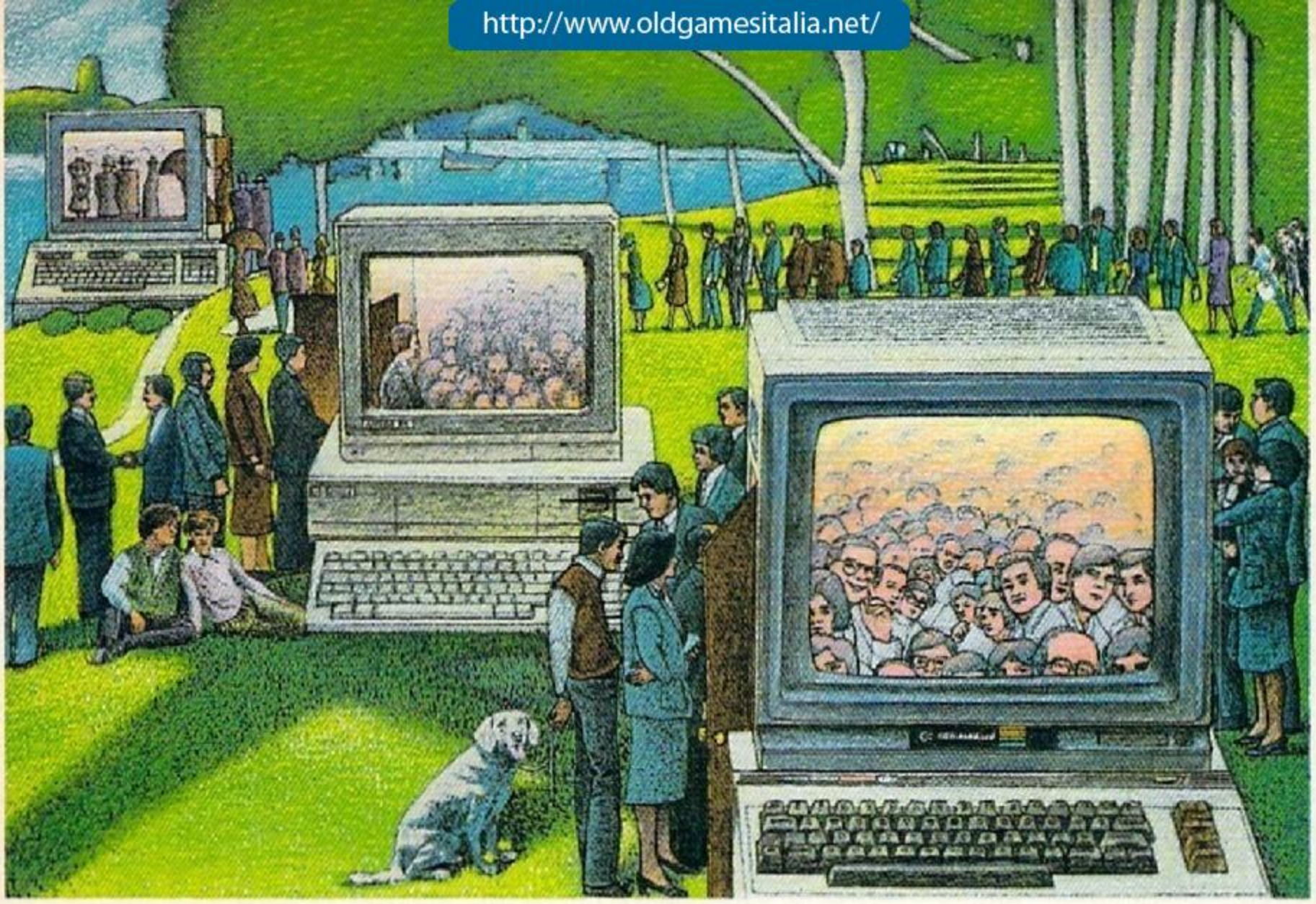

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ability to integrate datafiles produced by Superbase, an equally sophisticated database package.

Superscript is menu driven and extremely well documented. The system of branching menus allows novices to find their way with relative ease, yet can be ignored, in favor of single-letter commands, by those who've spent some time with the software.

It does everything you'd expect from a word processor, and is particularly strong in its ability to print reports requiring lists of numbers. Numeric tabs, adjustable decimal places and the ability to total lines and columns of numbers practically make this program a mini-spreadsheet.

The program has two separate text areas, and it gives you the ability to interrupt a screen preview, make changes and resume the preview without starting from the beginning of the document. Anyone who has ever spent hours checking the formatting of multi-paged documents will appreciate not having to cycle through the first 28 pages of a report in order to check the layout of the 29th page.

Superscript runs on the Commodore 128 in either 40- or 80-column mode. If your printer can handle it, the software also supports text up to 240 columns. The first time you run the program, you'll have to set up at least one work disk to hold your documents.

Unfortunately, only a limited number of printers will work properly without modification to the defaults file. It's not difficult to follow the instruction manual and enter control codes for your printer, if you know what you're doing. But software that the average home computerist buys should be ready to work right out of the box. My Gemini 10X with Cardco G-Wiz interface, one of the more popular printer combinations, was not fully supported by any of the six definition files on the Superscript disk.

However, once past this stumbling block, practically all you have to do is enter text and rely on the f1 key to help you manipulate it. The f1 key takes you to a series of branching menus that allow access to disk functions, preview or printout, embedded commands, text editing, spelling checker and the system's built-in calculator. All can be accessed simply by moving the cursor to highlight the desired function and pressing the return key.

Text entry is straightforward and simple. Word wrap is available and an insert mode allows non-destructive additions to existing text. The word wrap function is a bit lazy, and text must be reformatted after editing to restore unity to all the words on screen.

On many word processors, hitting the return key in the middle of a line automatically erases all text to the right of the cursor. Superscript's return is non-destructive. Text doesn't disappear unless you want it to. On the other hand, once something has been erased, it's gone for good. There is no undelete function.

Two excellent features are the user-definable keys (macros) and the Automatic Repeat command. Frequently used command sequences or text can be assigned to keys of your choice, saving a good deal of time when the software is used for repetitive tasks.

Editing functions are comprehensive, but at times clumsy. Text to be moved must first be identified by entering the Block Definition mode and highlighting it via the cursor controls. Logical cursor movement, the ability to move the cursor in increments of words or sentences, is unavailable for defining a block of text. Erasure of three words could require one three-stroke command followed by two CTRL-Rs.

Spending a little time with this package reveals some other minor flaws. The copy-protection scheme bangs the head of a 1541 disk drive every time the program is loaded, and the Printer routine doesn't automatically feed out the remaining portion of the last page.

On the other hand, the spelling checker deserves nothing but praise. You need only copy the dictionary on the back of the program disk to a separate disk to get the most out of this function. There is no need to exit Superscript in order to access the spelling functions. Not only does Superscript review your final draft quickly, highlighting candidates for correction, it can also learn new words as it goes, automatically adding them to its dictionary. Best of all, the search function allows you to look up words as you write.

On balance, Superscript is potentially the most powerful word processor available for the 128. Businesses and experienced users would have to search far to find more flexibility and features. The ease with which it handles numbers is astonishing. While novices can spend months, even years, without ever leaving the security of the full menu command system, experts will have a hard time outgrowing this powerful package. Other word processors may offer easier editing to the writer who does a great deal of text manipulation, but feature for feature, Superscript is hard to beat. *(Manufacturer: Precision Software, Ltd.; distributor: Progressive Peripherals & Software, 464 Kalamath St., Denver, CO 80204. C-128/ $79.95 disk.)*

John Premack
Lexington, MA

Elite A

Garner Galactic Riches

Silver Disk Series B

Take Your Pick of Ten Game Disks

There is an almost Jekyll and Hyde quality about the differences between Elite, a complex space trading-exploration-conquest game, and the simple arcade-like games of the Silver Disk series.

First, Elite has the greatest scope of any space simulation game that's ever illuminated my computer screen. It's more like a stock market in space. The goal of the game isn't to rid the galaxy of space vermin, but rather to buy and sell wisely, so that you can accumulate the greatest wealth.

Armed only with a pulse laser, three homing missiles, seven light years' worth of fuel, 100 credits and a Cobra MK III ship, you begin by blasting off from a space station orbiting the planet Lave.

But while the earth-bound denizens of financial empires have only

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bear and bull markets, depressions, booms and sluggish economies to deal with, the space trader will find things a bit more interesting.

Since there are eight galaxies and about 2000 planets in which to wheel and deal, the possibilities for accumulating wealth or losing your shirt are nearly endless. Traveling between planets is no picnic, what with pirates eager to rob you of your possessions if you relax your defenses.

Depending upon your own greed, you may choose to deal either in legal goods or slightly less than legal fare. For example, you can try asteroid mining or take up bounty hunting.

Execution is fast, especially in maneuvering your ship during combat. Though commands are given in a combination of joystick and keyboard inputs, most of the quick maneuvers are done with the stick. In combat, one set of normally idle keys will prove invaluable. The f1 through f7 keys control your viewpoint (front, back, left, right) of the screen.

When you're docked at a planet, those same keys will control all of your trading functions.

The documentation is superb. Not only is there a concise, 64-page Space Traders Flight Training Manual, but there's also a Robert Holdstock short story, "The Dark Wheel," which serves as a background piece on the Elite world, and a Quick Key Control Guide to enable you to scan your command choices in seconds. You may not have much more time than that.

As a couple of hints, take notice of what goods sell well on what type of planet. Look for patterns in price fluctuations. Also, don't be too foolhardy in battle, but at the same time, don't retreat just because you think you're overmatched.

But my best hint for you is to buy Elite for some complex space adventures that are as interesting and diverse as any I've seen.

Having also played all ten games in the Silver Disk series, I can confess to both joy and disappointment. Of course, much can be said for getting a pair of games for $19.95 (the cost of each two-game disk), but there are also some other things that might be more than you bargained for.

Frustration is one of those. None

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of the ten games has adequate documentation. This means that learning the game, for the most part, is a seat-of-the-pants experience. And that's not bad for the strictly arcade games like Booty, Gerry the Germ, Microcosm and Chicken Chase.

In Booty, you're trying to grab all the loot you can from several holds of pirate treasure, while at the same time avoiding ghosts, rats and the captain's parrot. In Microcosm, you're trying to keep a shipload of priceless plants alive until help arrives. In Chicken Chase, you're protecting the hen house, while trying to make the most of some friendly treatment from Madame. I still haven't figured out what Gerry the Germ is really about.

The other games in the series are graphic or arcade adventures. In the sight-and-sound department, these games are easily worth the price. The graphics are bright and clear, if not entirely functional. The music is pleasing, even though it can get tedious. Some games have functions for turning off the sound.

Some of the games have a fast loader. When these games are used, you must disable any fast load cartridge you might be using or the game won't load properly.

I suppose the true value of these games is in the eyes of the customer. And I guess that most of the ten would be worth the cost. Arcade gaming hasn't yet died, and it's a vice that isn't quite as expensive as it used to be. *(Firebird Licensees, Inc., PO Box 49, Ramsey, NJ 07446. Elite: C-64/$29.95 disk; Silver Disk Series: C-64/$19.95 each disk.)*

Rick Teverbaugh
Anderson, IN

Leader Board

A

Putting On the Fritz?
Iron Out Your Weaknesses
With this 3-D Golf Game

Even if you've never set foot on a golf course, you're likely to find Leader Board to be one of the most enjoyable sports simulations to come along in quite some time. Unlike other golf games that use map-like, overhead views of the course, Leader Board provides a subjective, three-dimensional perspective of the fairway that positions you behind and slightly above your on-screen golfer.

Adding further realism are the superb animation and sound effects. When you tee off, for instance, your down stroke slices through the air with an authentic "swoosh" and smacks your ball with a solid "crack." All the while, the golfer's movements are smooth and life-like. As the ball climbs, gently arcs, and bounces appropriately against its own shadow on the green, you'll swear that gravity's controlling its flight.

When the ball lands in one of the many water hazards, you not only see a small splash, but you hear it as well. And, the closer you are to the splash, the louder it sounds. Even the familiar hollow "plop" of your golf ball dropping into the hole and the slight metallic ring as the ball deflects off of a flagged marker pole have been accurately reproduced.

But it's not just the sights and sounds of Leader Board that make it hard to stop playing. The game also includes many features and options that give it the depth of play necessary to keep things interesting round after round. From one to four golfers can tee off, with each player competing at his own ability and experience level. You can play 18, 36, 54 or 72 holes using the game's four 18-hole courses in any combination.

Each golfer has a choice of three woods, nine irons, a pitching wedge and a putter that is automatically selected on the green. To help you decide which club to use, your distance from the hole is displayed before each shot and the minimum and maximum ranges for each club are listed in the instruction booklet. The actual distance you get on each shot, as well as the degree to which the ball will hook or slice when playing at the professional level, depends on the wind direction and speed, the slope of the green (when putting), and the exact timing of your pressing and releasing the joystick fire-button. To help perfect your timing, Leader Board even features a driving range where you can work all the kinks out of your swing. About the only thing Leader Board is lacking is an option to save long games in progress. Once you begin a round, however, you probably won't want to stop until you've completed every hole.

Leader Board isn't copy-protected, so you can easily make all the backups you need. The copies will only work, however, if you have the key that comes with the original program disk plugged into the cassette port of your 64 or 128. *(Access Software, Inc., 2561 S. 1560 W., Woods Cross, UT 84087. C-64/$39.95 disk.)*

Bob Guerra
Charlestown, MA

WillWriter

B

Leave Your Inheritance
And Estate Planning
To WillWriter

It took me 15 minutes plus printer time to write a four-page will using WillWriter. My will is simple, but it has everything I need, and, when I sign it before witnesses, it is a legal instrument. WillWriter provides for the distribution of simple estates according to the laws of your state, and lets you recommend a guardian for minor children. Its wills are valid in every state except Louisiana.

The documentation is excellent, both in the 200-page manual and within the program. The manual goes far beyond telling you how to run the program. It explains not only what WillWriter can and cannot do, but also covers the basics of the laws of inheritance and the principles of estate planning. It is written in clear, simple language that anyone can understand.

The software package is probably worth its cost just in the education it gives you, even if you don't use it to write your will. It covers as much as most adult education courses in estate planning. While the book does not pretend to give legal advice, it explains enough to help you make informed decisions on how to provide for your family and to help them avoid paying inheritance taxes for which they should not be liable.

The software lets you dispose of

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specific personal property to as many as 16 beneficiaries. You can name an executor and specify other choices if you outlive him. It allows you to disinherit your children or others who have a claim on your estate. The program reminds you, however, that most states don't permit you to cut your spouse out of your estate. You can save your will to disk and update it easily if you move to another state, have more children, change your marital status or just your mind.

Unfortunately, WillWriter also has many limitations. For instance, you cannot divide your real estate, as the program assumes you will use one of several techniques for passing on real property outside of probate. Also, you cannot leave a bequest on the condition that your heir fulfill some requirement, nor can you provide for your funeral or for the care of your remains.

The print program is primitive. It provides no margins and uses the back arrow instead of the dash for signature lines. While the document's appearance has nothing to do with its function, a professional-looking format makes a will more credible.

If you have complex last instructions or a complicated estate, you need a lawyer. But, if you merely wish to leave everything to your spouse and children, or have a few simple bequests, you just need to make sure you have the right form and language. WillWriter provides these and the necessary instructions on how to execute the will. For most of us, it's sufficient.

My estate isn't large enough to be taxed, but now I am assured that my family heirlooms will go to my sisters and that no one can quarrel over what little I own. WillWriter costs less than a visit to a lawyer, and I can update my new will any time I wish, at my convenience and in the privacy of my home. Because of it, I now know as much as I need about estate planning until I acquire more property or there are more claims on my estate. WillWriter is a computer application that simplifies my life and increases my personal options. I like it. *(Nolo Press, 950 Parker St., Berkeley, CA 94710. C-64/$39.95 disk.)*

Annette Hinshaw
Tulsa, OK

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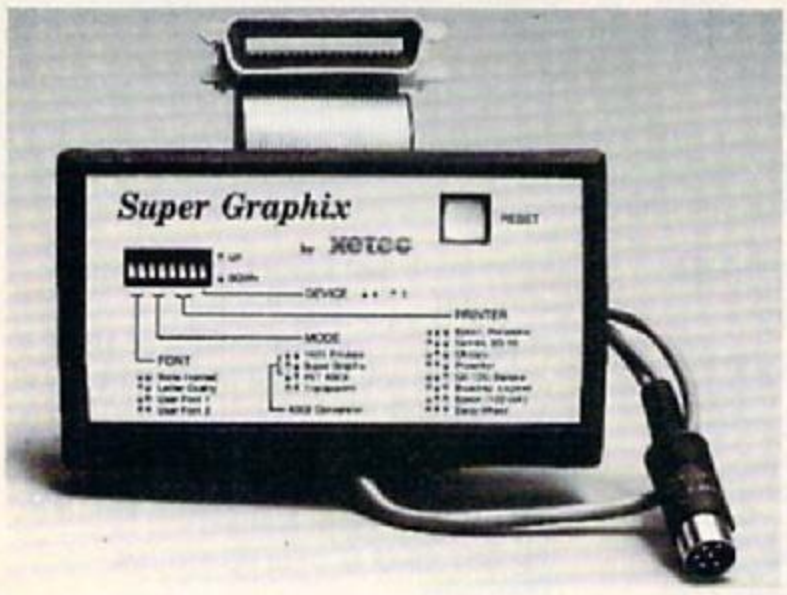

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Bank Street Filer A

Here's an Easy-to-Use Electronic Filing Program To Organize Information

You may not always be able to tell a book by its cover, but in some cases you can tell quite a bit about a software package by its title.

That's true of Bank Street Filer. This is a program that many other software producers would call a computer-driven database. But that does sound too pretentious and complicated for a Bank Street program. All of the software developed by the Bank Street College of Education and marketed by Broderbund has a reputation for being simple to learn and easy to use.

So Broderbund decided to call this home productivity package exactly what it is—an electronic filing program. But don't think that makes it any less powerful than programs that call themselves databases. Bank Street Filer will do almost everything they do, enabling you to organize information, store it on disk, update and sort it and make printouts.

Like Bank Street's word processing, mailing and spelling programs, this program is extremely user-friendly; so much so, in fact, that it gives you four different ways to use it.

The one I find particularly appealing is the tutorial program that comes right on the program disk. Boot up the program, and your C-64 will take you on a guided tour of Bank Street Filer. You'll be shown the basics of operation and be given a chance to try many of its functions. Even if you've never used a computer before, the tutorial should get you off and running.

If you prefer the more traditional approach, Bank Street Filer comes with a wonderful 93-page instruction manual. It's complete, easy to follow and simple to understand. You can read the entire manual or, if you want to get started right away, just the first 20 pages.

Within those pages you'll find yet another way of "Getting Started," which is the title of that chapter, which

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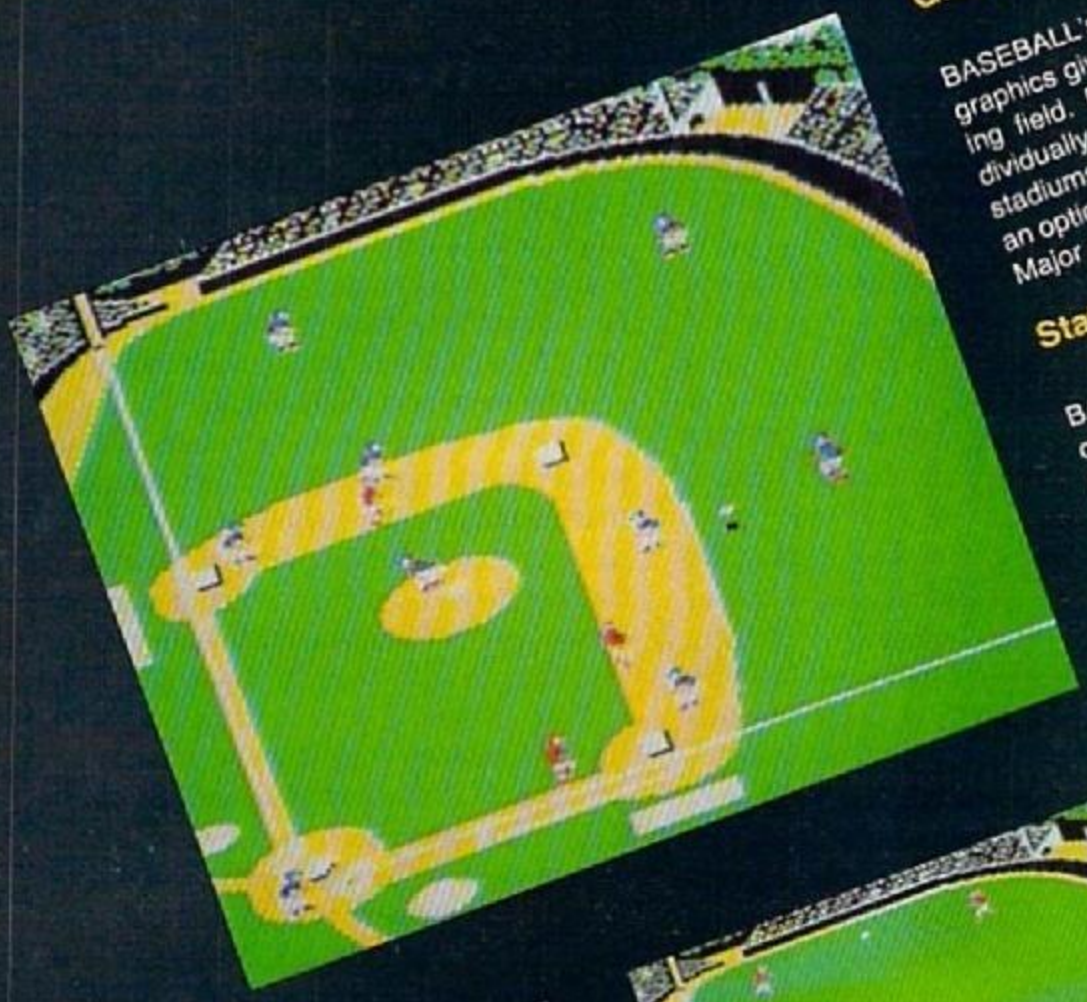

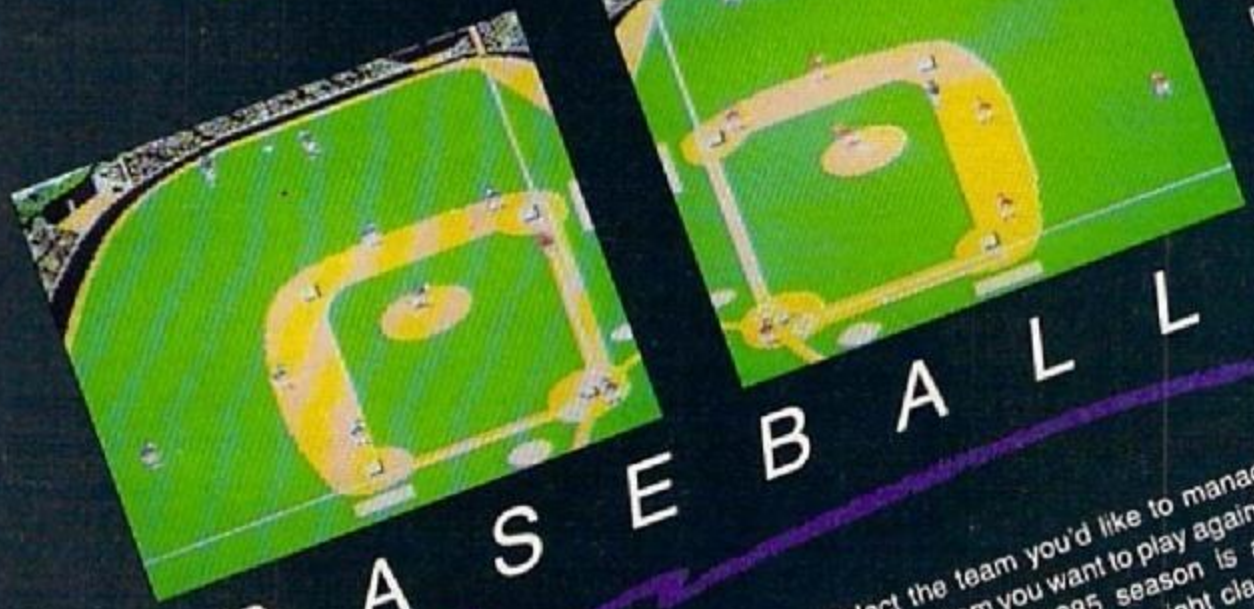

BASEBALL

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Game Play

BASEBALL's underlying statistical framework simulates the realities of baseball like never before. Within this framework, the program considers each player's batting statistics against both left-handed and right-handed pitchers, and pitchers statistics vs. left- and right-handed batters. Every player's fielding and base-running abilities are also considered (an important factor when attempting to steal a base, etc.).

Select the team you'd like to manage, then pick the team you want to play against. Every team from the 1985 season is accurately represented, along with eight classic teams from the past. Determine your starting lineup, designate a starting pitcher, and make player substitutions when necessary. You call the plays, offense and defense. In a one-player game, your computer opponent displays uncanny intelligence in reacting to your managing decisions.

Manager's Functions

Built-in manager's functions provide extra versatility. You can trade team players, draft new players, create your own team, even form your own league. The program's stat-tracker keeps track of your team's season statistics and individual player year-to-date stats.

Graphics

BASEBALL's highly-detailed animated graphics give you a perfect view of the playing field. Each player acts and moves individually on every play. Three different stadiums are included with the program, and an optional Stadium Disk lets you play in any Major League stadium in the United States.

Statistics

BASEBALL can maintain a complete statistical record of each team player's performance. All player stats and game Box Scores can be displayed on the screen or sent to an external printer for a hardcopy printout.

BASEBALL also includes a unique Auto-Play option that lets the computer play a complete game in less than three minutes. A whole series of games can be played unattended, and an entire season of player and team statistics can be compiled over several days with all game stats printed out for your records.

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or write or call for more information. BASEBALL is available on disk for the Commodore 64 and Commodore 128 computers. For direct orders please enclose $49.95 plus $2.00 for shipping and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club cards accepted.

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is basically a condensed version of the rest of the manual, including some special "Quick Start" instructions.

Another set of quick-start instructions—and the fourth way to get into Bank Street Filer—comes in the form of an index card that contains just enough information to get you going. This card may be enough for those who have used other Bank Street programs, but its contents are a bit too sketchy for my taste.

Whichever instructions you choose, you'll undoubtedly find Bank Street Filer easy to use, because it is totally menu driven. Menus appear on virtually every screen within the program, and most are accompanied by instructions. Commands are similar—in many cases identical—to those in the other Bank Street programs; and, if you ever do get stuck, a help screen is always just a keystroke away.

In addition to being easy to use, a good filing program should be flexible, which Bank Street Filer is. Using an address book as an example, why not list birthdays, anniversaries, clothing sizes and hobbies of every person entered in your file? A simple computerized search at the beginning of each month would mean you'd never forget to send a birthday card to that rich aunt or uncle whose will you're in. And imagine how much easier it would be to buy her or him a Christmas gift.

Bank Street Filer makes it easy for you to store and retrieve that kind of information. You begin by creating the format on which you want to keep your records, with various menus guiding you through the process. A record is an electronic file card that consists of different categories of information called fields. Each record in Bank Street Filer can have as many as 50 fields, each capable of storing about 80 characters of information.

A nice feature of Filer is its ability to let you set up fields that can be "computed." This means that if your fields contain numbers or money figures, you can instruct Filer to perform various calculations within your records. Within a file created to keep track of club members, for example, you could have Filer automatically calculate dues paid to date and dues owed.

Features such as these make Filer a powerful program. And Filer can perform many other functions you'd expect from a database, such as printing out records in various configurations or sorting information alphabetically and searching through those records.

Bank Street Filer's search and sort procedures are among the easiest to use of any filing program on the market. You set the conditions for a search or sort by completing the sentence, "Find every record where...." The items you use to complete the sentence come from menus containing your own field titles and other key words provided by the program.

Since these are based on the type of fields you create, it's unlikely you'll come up with a search criterion this program won't be able to carry out. That, of course, assumes that you do a little planning and have a pretty fair idea of what you may later want to search for when you first set up your records. But if you happen not to be such a great planner, Bank Street Filer even allows you to add, delete and move fields after the file is created.

In fact, there's very little in the way of electronic filing that this program won't allow you to do. Its only real limitation is in the small number of fields and characters per field you can store on each record. This can be a problem in some unusual applications, so make sure the records you want to keep will not exceed the program's limitations.

I expect those cases will be rare, since Bank Street Filer is one of the most powerful, flexible and easy to use programs of its kind. Unless your needs are exceptional, you'll probably be delighted with this program. So much so, in fact, that you may give the old address book the heave-ho. *(Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. C-64/$49.95 disk.)*

Scott Wasser
Wilkes-Barre, PA

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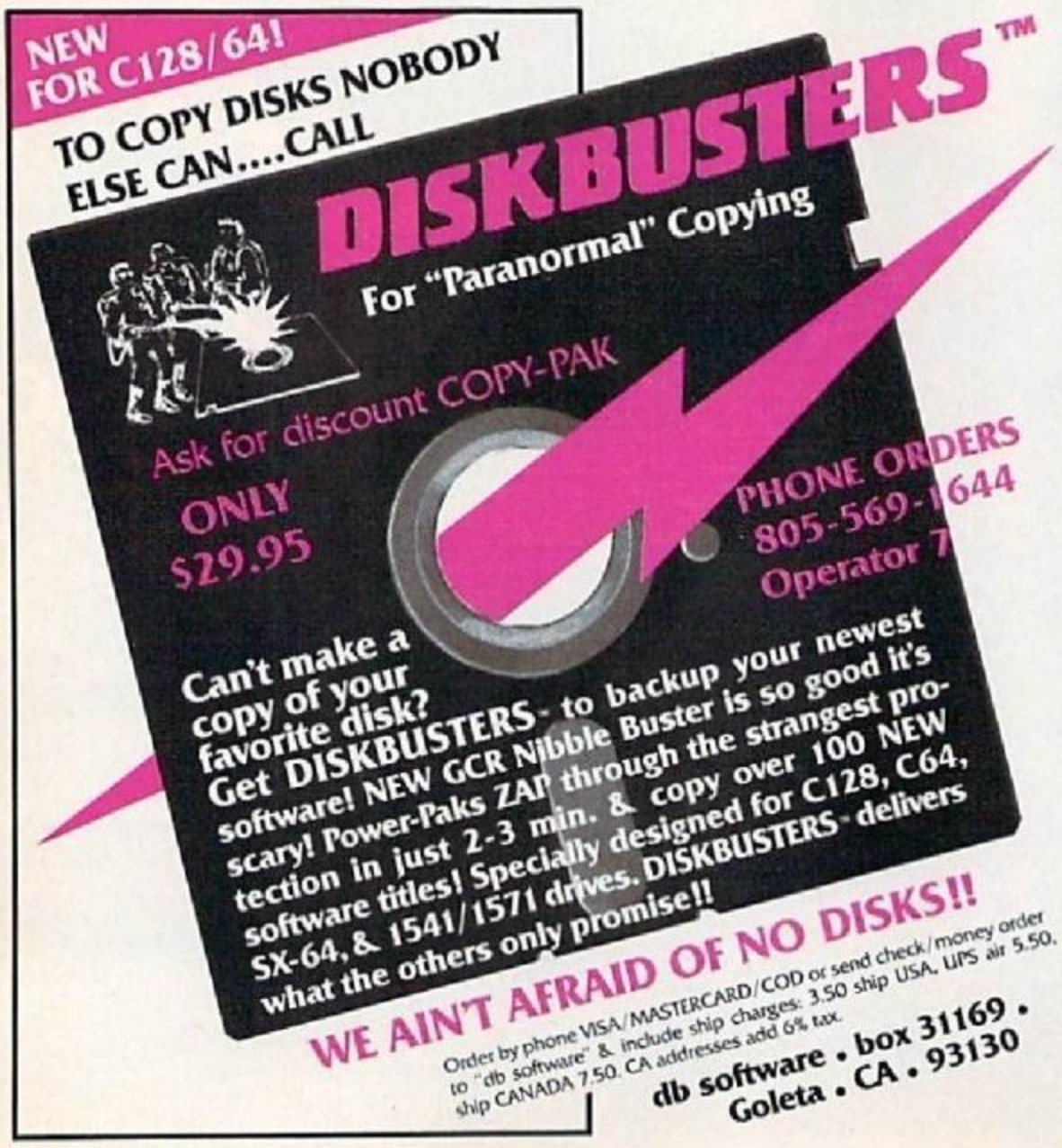
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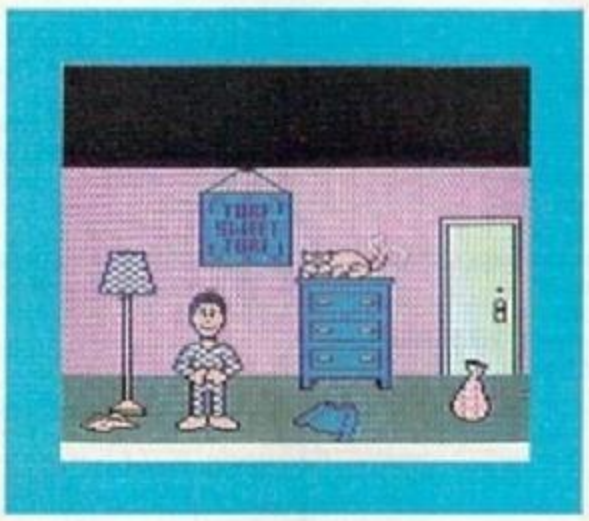
Definition

Habitat: A make-believe world inhabited by small, colorful creatures, called Avatars. Human beings may visit Habitat and move freely about its regions, interacting at will with Avatars. Human beings reach Habitat by traveling many miles through tiny telephone lines and entering through a large gateway, called QuantumLink.

Once a human being enters Habitat, he or she takes on the visual form of an Avatar, and for all intents and purposes becomes one of these new-world beings. In the world of Habitat, people can play games and go on quests, but mainly they meet other people and have fun.



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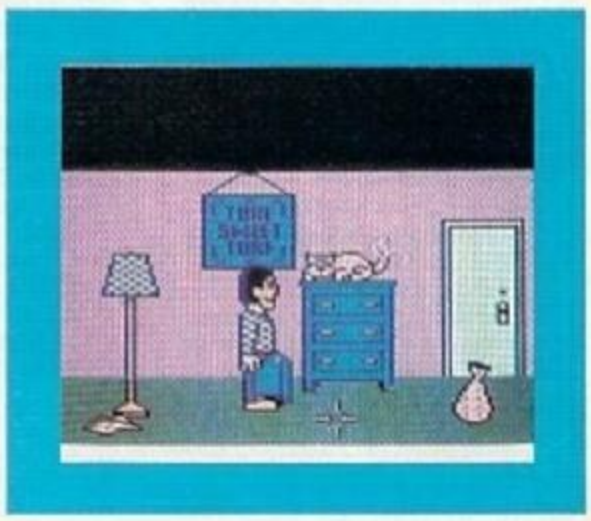

Photo 2.

Lucasfilm's Vision

We all know Lucasfilm as the company that created such blockbuster films as Star Wars and The Return of the Jedi, but Lucasfilm has done much more than make movies. For several years, the company has invested in an extensive research and development effort, conducted by the Lucasfilm Computer Division. Its primary aim is to develop new technology for filmmaking and to discover what kinds of interesting things might be done in the entertainment field by applying the technology that exists for manipulating information.

Their efforts have promulgated a new computer graphics technology and new off-shoot companies. One Lucasfilm project in computer graphics spun off into a company called Pixar, now owned by Steven Jobs. Pixar has developed the newest state-of-the-art graphics computer in the industry.

Lucasfilm is involved in projects dealing with film editing using videodisc technology, and in digital-audio projects for film sound editing and sound effects. The company also develops game software for a variety of home computers, Commodore included. They now have four games that are marketed by Epyx: Ballblazer, Rescue on Fractalus, Koronis Rift and The Eidolon.

The people at Lucasfilm have a vision. As stated by Chip Morningstar, the principal designer and architect behind Habitat, this vision is "that films and television and computer games and interactive technology are all on converging paths."

In all cases, the intent is the same: to convey ideas, stories and sensations to people. But the boundaries between various forms of technology are becoming blurred as people, like those at Lucasfilm, start doing experiments with interactive theatre and computer animation.

"At some point," says Aric Wilmunder, graphics programmer on the Habitat project, "there will be a merging. There is already a crossover. We're going to see it very soon with the compact disc interactive projects—CD ROMs."

Stephen D. Arnold, Director of Lucasfilm Games Division, sums it up this way: "Habitat is another way to

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make interactive technology teach us about what's possible and what's interesting and what's fun for people and for us to do. Our charter is to anticipate the synthesis of interactive technology and film-making; to experiment with it; to craft it into better entertainment experiences. Habitat is another piece of what we hope is the ability to move ahead in entertainment technology all across the board."

Accessing Habitat

Habitat is only available through QuantumLink (1-800-392-8200) and requires that you have a Habitat program disk and an object database. Q-Link was chosen by Lucasfilm because the network was best set up to handle the graphics, sound and interaction that Habitat relies on.

Also, there are six million C-64s in the real world, and the price of the new 64C is so low that just about anyone can afford to go out and buy this computer, a modem and a sign-on to Q-Link, which is now a captivating network for Commodore owners. Lucasfilm programmer Randy Farmer handles the communications between C-64 program development and Q-Link's mainframe.

To find Habitat on Q-Link, you make menu selections. (Its exact location was not determined at the time this article was written, nor was its exact name finalized.) Once you are on Q-Link and decide to enter Habitat, you'll be prompted to take out your Q-Link disk and put in your Habitat program disk.

Visualizing Habitat

I got a chance to preview Habitat with the Lucasfilm people at the Consumer Electronics Show in Chicago last June.

The Habitat realm is unique. It is actually like a cartoon world in which you get the chance to play a permanent part. You are able to select your looks, your home (turf), your clothes, your furniture, your pets—all those things that are inherent in our own real world.

You live in your home, have a telephone and your own mailbox. You can walk around just like a real person. You can see other characters and yourself on the computer, and others can see you. You can also speak to others, interacting with them through this huge game, and can become involved in adventures, fantasy and special quests.

The Lucasfilm team has provided the ability to perform most of the activities that you are normally accustomed to performing in your everyday life—but you perform them via your computer.

Sound strange? Well, at first it is. It's actually a huge leap beyond what you usually think you can do on a telecommunications network. In the words of Wilmunder, "What you should visualize is making a play—and you're the set designer. Imagine a little cardboard tree on a little stand that you can walk behind. The world graphically is based around a backdrop like those they bring down at the rear of a stage. The Avatars are to a great extent very much like actors inside this world.

"Right now, a lot of people use the chat system on telecommunications networks, and they create their own personalities. To a great extent, Habitat is super-chat, or a great extension beyond chat."

How Do You Get Born?

All the objects of the Habitat universe are on your disk in a large database. They have been designed by Lucasfilm's artist, Gary Winnick.

When you join Habitat, you have access to the same objects as everyone else. From these, your first task is to decide what you will look like to others. You may be male or female, of course. You can pick the color of your hair, the shape of your head and your facial features.

Once you've designed your physical person, you can then pick those objects that you want to have as part of your own world. It's just like going to a store and shopping for your clothes, your furniture and other items that you want.

In addition, there is an Official Avatar Handbook, which tells you such necessary information as great moments in Habitat history, do's and don'ts of social behavior in Habitat, how to assemble an impressive wardrobe, great Habitat movies and the mandatory reading for all Avatars. There are other goodies in this handbook that are bound to elicit a chuckle as you become familiar with the Avatars' world.

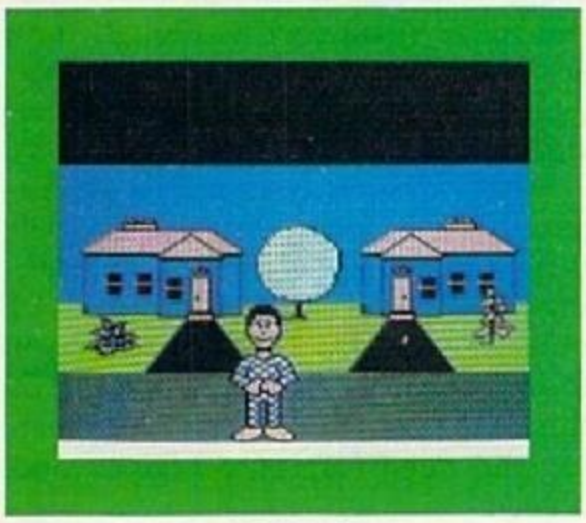

Photo 3.

Photo 4.

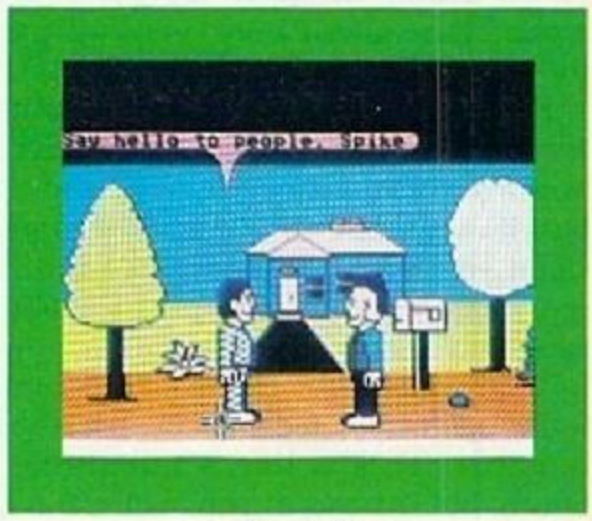

Photo 5.

How Do They Do That?

The Lucasfilm programming and design team have brought cartooning technology into the creation of these objects. For example, your body is composed of different parts. To create animation, your torso remains the same, while the legs and arms are changed in sequence.

The big difference between Habitat and other on-line social interaction is not just that you can see who you are speaking with, but that you can move freely through a huge world populated by other people and recognizable real-world things.

The animation on Habitat is fluid, and the graphics are all bit-mapped

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Photo 6.

Photo 7.

Photo 8.

images, so that you see smooth circles and curves around the images. Also, this world has color and sound. You can move objects around, people can walk and things make sounds. Some of the objects in the world are just for decoration, but many are functional.

For example, your telephone works like a real phone. When you pick it up, you hear a dial tone. When you dial a number, you hear it ring. When the other guy is already on the phone, you get a busy signal. To find out someone's phone number, you consult a telephone book. To get your name in the phone book, you contact the telephone company.

Every house has a mailbox out front, where you can send and receive messages. The bureau in your room has drawers that open and close, and when you open the drawer, you can see whatever is inside and pick out what you need.

To travel within Habitat, you can walk, or, for long distances, use the teleport. This is like a telephone booth, but instead of your voice traveling somewhere, your body goes there.

The Habitat world is composed of many screen regions, or places. When you move off the side of one screen region, it is replaced by a new one. The idea is that each region is connected on all four sides to other places, and those in turn are connected to still others.

The Oracle

Habitat is not a world left alone to its own devices. There is an extra-worldly presence that oversees everything and everyone. This is the Oracle.

The Oracle is available to those who seek him. You can ask the Oracle for advice, file complaints against evil-doers and nasty people, and otherwise be in touch with Habitat's Almighty One.

The Oracle grants wishes and sends Avatars on quests and adventures. It occasionally plays tricks on Avatars. It can step in at any time to intervene in the various dramas that are being played.

Conflict is an important element in drama, and Habitat is rather like an ever-evolving drama. The creators have deliberately included objects in the world that will evoke fear and motivate Avatars to band together for their common good. The inhabitants of Habitat have a strong respect for life and community and are careful not to upset the Oracle.

How Do You Control Your World?

You control the activities, movement and speech of your Avatar throughout Habitat with a joystick and keyboard typing. There are five simple, yet powerful commands that you have at your beck and call: Go, Do, Get, Put and Talk.

If you want to move your Avatar, you tell it to Go. You place the cursor at the spot to which you want to move, press the joystick button, toggle the stick to the Go position and release the button. Your Avatar then walks to the cursor position.

The Do command makes your Avatar perform the action dictated by the object at which you are pointing your joystick. To close the door, you point to it, press the joystick button, select Do and release the button.

To pick up objects in the Avatar world, you Get them with the joystick. To place objects down somewhere, you Put them.

The Talk command does not require the use of a joystick, as do the other four. You speak to other Avatars by pointing at them with the cursor and typing your words on the keyboard.

The words appear in a message bar at the bottom of your computer screen. When you want to send your message, press the return key. Your words will move from the message bar to the top of the screen where they will be held in a colored balloon, reminiscent of a newspaper comic strip.

As the World Grows

The Habitat creators are dedicated to letting the individual express creativity. The entire system has been designed so that all participants can implement their own individualized appearance, places and activities.

The designers and programmers have provided the ability to create a visual impression for the users that will make them feel as though they are actually doing something in the world—that they are real people inside that world.

When Habitat goes public in August, it will include close to 2000 different pre-made regions, or backdrops. And there will be hundreds of objects with which you can adorn those backdrops. But even with all of this, the design team is anticipating the need for more regions and objects.

"The intent is that the world will be a constantly growing and evolving place," says Morningstar. "It will be constantly changing, with new things being added to make this an interesting place that you'd want to visit. Habitat is very much like our real world, but with one big difference...it's rigged to be fun."

"The reason that QuantumLink has been so successful," says Wilmunder, "is that it's very much in tune with its audience. And the same will be true with us. If the audience says we need this or that widget, we have to have the system there to do this. So, we're putting in the hooks so that we can create more objects after the world's been around a while."

A Trip Through Habitat

Let's take a little trip through Habitat. The photos accompanying this

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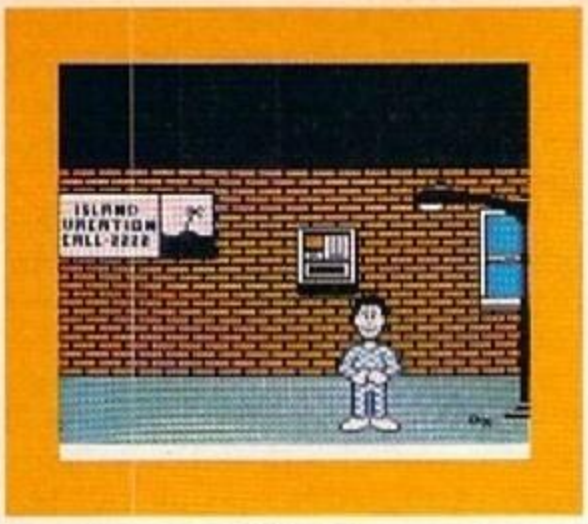

Photo 9.

Photo 10.

Photo 11.

article were taken while Habitat was still in its developmental stages, but they'll help you to visualize this world.

Our Avatar is Phred. We start off with Phred in his "turf" (Photo 1). He is a simple, unassuming guy, who doesn't go overboard on internal decorations, like some of the other Avatars. He is content with a bureau, a floor lamp, a Turf Sweet Turf picture, and his faithful cat, named Friday.

Friday lies on top of the bureau and patiently waves his tail as he waits for Phred to put on his shirt and get ready to go outside. When Phred is ready, he moves to the right side of the room, opens the door and goes outside, where he stands in front of his house taking in the clean fresh air and the view.

Walking down the sidewalk, Phred meets his friend, Spike. They stop and chat for a while in front of Spike's house (Photos 4–7).

Spike is an erudite fellow and welcomes the opportunity to speak to *RUN*'s readers. (I wonder if he ever found his bike.)

After a bit of chit-chat, the friends go their separate ways. Phred has to go to the bank. He has been planning a trip to a tropical vacation island for several weeks, and he has to pick up his travel money at the electronic teller (Photos 8 and 9).

I wonder if he ever noticed that key on the ground under the lamp post. When he gets to the island, he'll kick himself for not picking it up.

After getting his money and hanging around downtown for a while doing other errands, Phred heads off for the island (Photo 10). It's a great place to be. Phred loves palm trees and lying in the sun. This is just the break he needed from his hectic job at the daily newspaper.

The island is fun, but Phred wants to get back into civilization. He teleports himself back to his hometown, meets a nice girl in the park and introduces himself to her (Photos 11–13).

This is a typical Avatar park, with its fountain, mailbox, street light and, of course, a trash can. You may notice that Phred is now carrying a boom box. He stopped off at the store on

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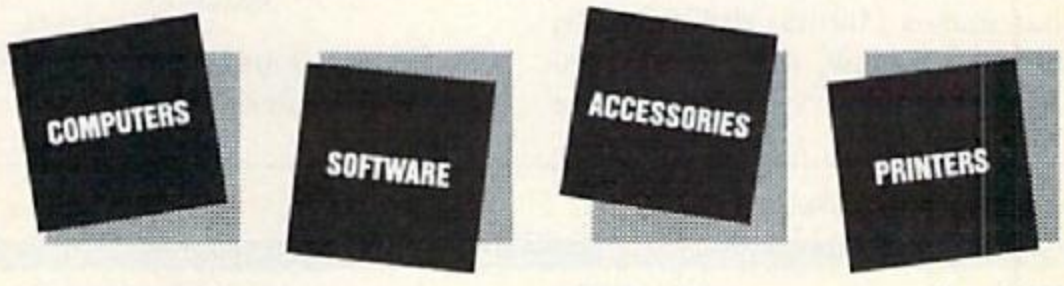

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his way back from the island and bought it.

A little later, Phred will walk back to his turf, if he doesn't get sidetracked along the way.

Implications of Habitat

Habitat is a direct outgrowth of the fact that social interaction is a primary use of telecommunications in the home today. If you look at CompuServe's CB Simulator and Q-Link's own People Connection, you'll see a demonstration of this large-scale social element.

"Habitat," states Stephen Arnold, "offers a lot of the social aspects that people now enjoy in a telecommunications environment, where you're talking to each other, relating to each other as human beings. It will have the additional world-simulation dimension of having characters and graphics environments that will allow you to experiment over the phone lines with dimensions of shared interactivity other than those you can experience with text."

What makes Habitat different? In Morningstar's view, the current online interaction on systems like the CB Simulator and People Connection is very transient. People talk; they come and they go; but it is very much a stream-of-consciousness activity, focused on the present. There is no sense of continuity from time to time; no sense of place.

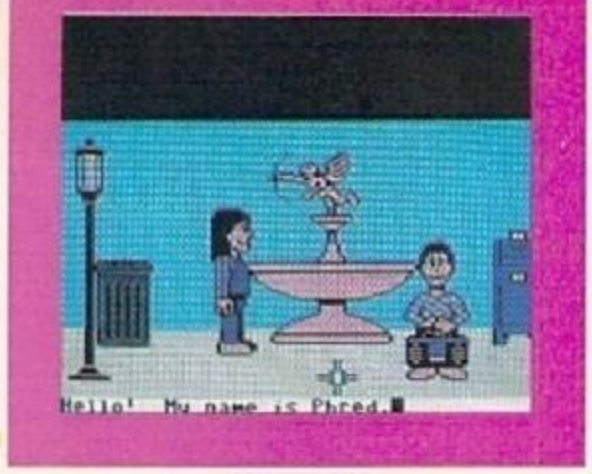

Photo 12.

Photo 13.

"One of the things that we want to achieve," says Morningstar, "is a sense that Habitat is actually a world where you can have a lasting effect, where you can make changes. Your changes will be things that other people will come in contact with and experience. You can affect other people in a lasting way through your interaction with the environment you're in—which I think is much more satisfying."

"In a simulation, it's a different experience to have a world that cares whether you're there or not," says Arnold. "Habitat has a lot of promise for adventuring and gaming and the social aspects of exploring imaginary worlds. If it comes to matter to people as another world that they care about, it will add an experience that hasn't really existed before." R

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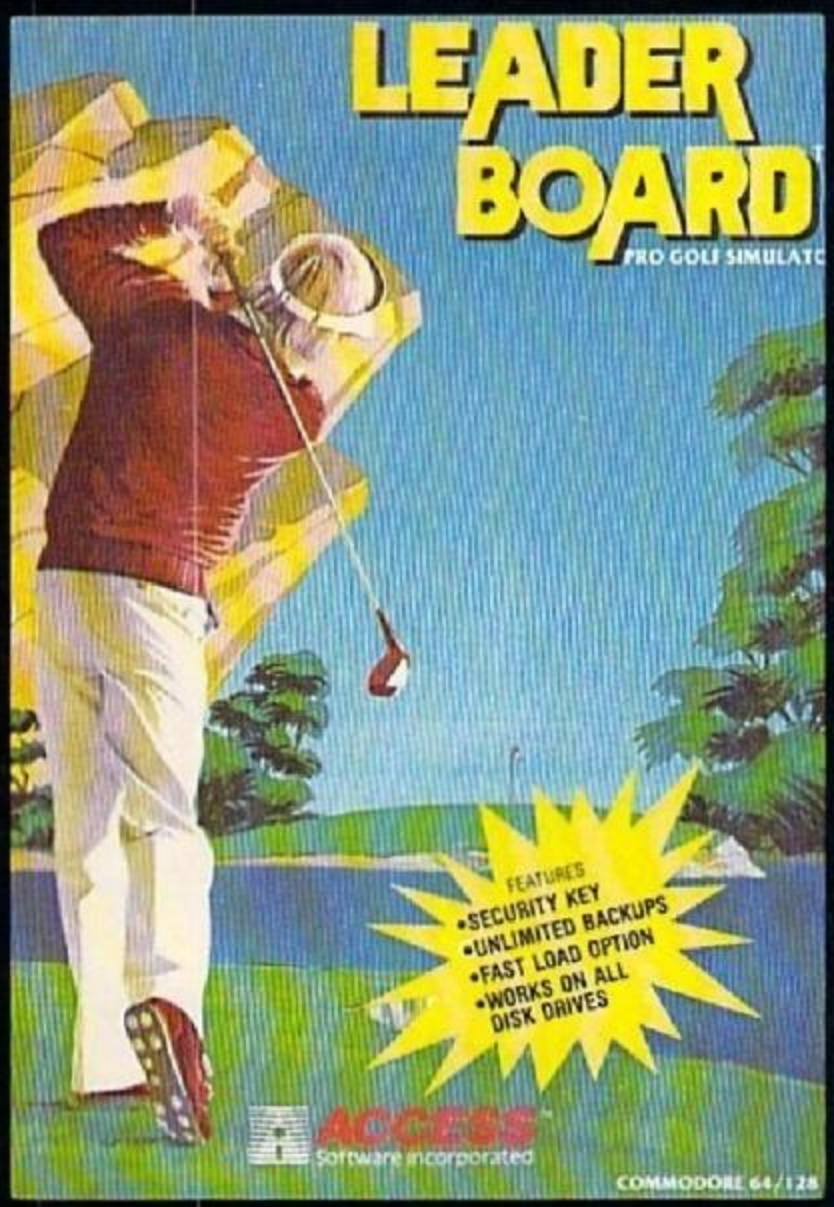

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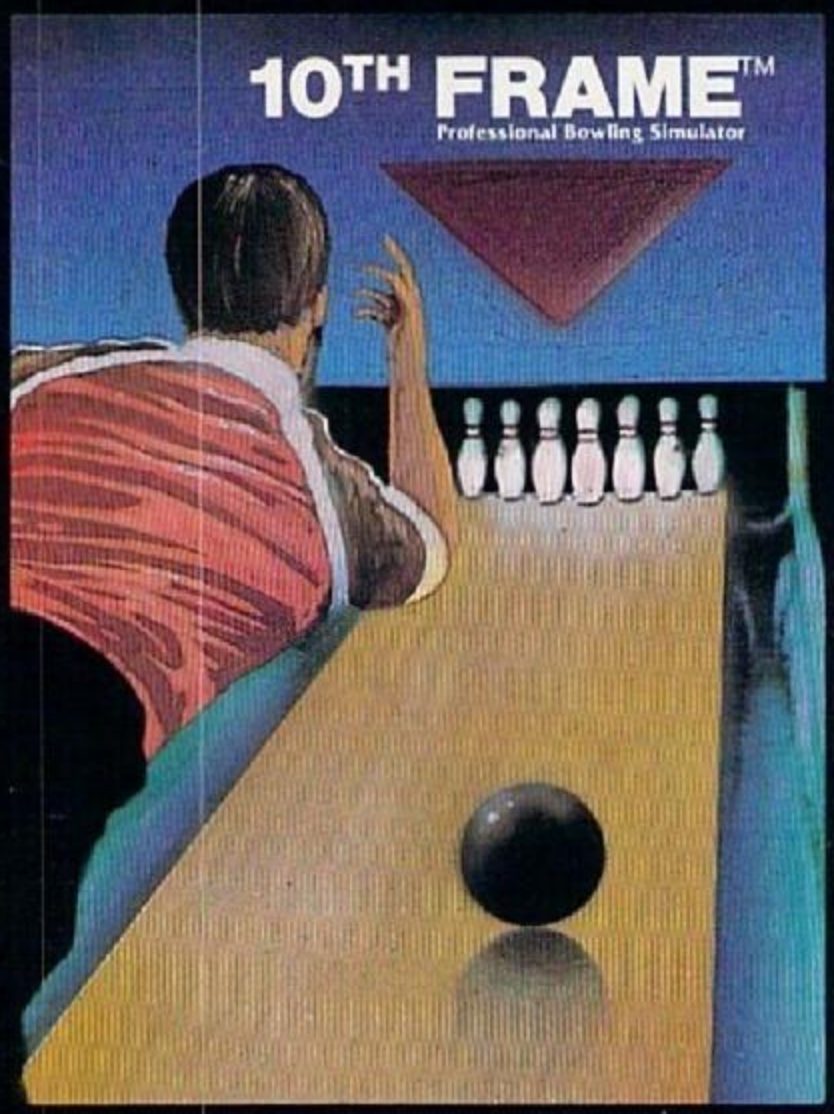

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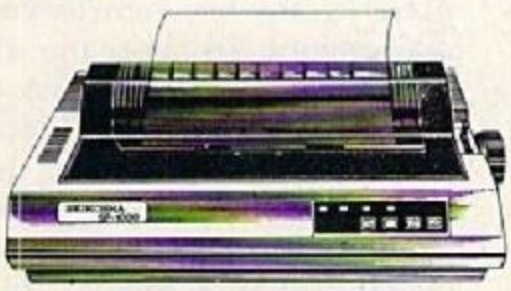

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Disk Keeper

This menu-driven disk utility performs a variety of functions, from formatting your disks to making disk jackets.

By MICHAEL BROUSSARD

My computer workstation is usually stacked with piles of papers, books, disks and other paraphernalia. Cleaning up involves throwing away the obsolete listings, returning the books to their proper places on the bookshelf, putting the disks back into their jackets and filing them in their respective cabinets.

It was during one such cleaning binge that I wished I could carry the clean-up process down to the disk level. If only it were easier to make labels, get rid of obsolete files, protect important files from accidental deletion and perform other disk-keeping chores. Well, now I can, and you can, too—with Disk Keeper.

Disk Keeper is a menu-driven utility designed to help you easily manage your disks. This article is divided into two sections. The first part explains how to use Disk Keeper, and the second explains some of the more interesting technical aspects of how the program works.

How to Use the Program

To use Disk Keeper, simply load the program and type RUN. Disk Keeper prints the following menu:

```
1) DISPLAY DIRECTORY
2) MAKE DISK LABEL
3) CLEAN UP DISK
4) PROTECT FILE
5) UNPROTECT FILE
6) RENAME DISK
7) FORMAT NEW DISK
8) SEND DISK COMMAND
9) EXIT
```

You are then prompted to choose one of the activities on the menu. Simply type in the number of your selection and press the return key. Depending on the option that you choose, you may be prompted for further information, such as a filename. When Disk Keeper is waiting for input, the cursor will be blinking in an input window. While the cursor is in this window, you'll notice that some keys (the cursor keys, for example) do not work.

To correct a typing error, you must use the DEL (delete) key to erase characters to the left of the cursor. Once you have typed the requested information into the window, press the return key. When an input window is empty, pressing the return key will usually return you to the main menu and abort the operation in progress.

Following is a description of what each menu selection does.

Display Directory. This menu selection displays the filenames, sorted in alphabetical order, on the disk currently in the drive. A typical entry might look like this:

```
7 MYPROG        PRG<
```

The sample entry shows that MYPROG is a program (PRG) file that takes up seven disk blocks. The "<" character after the filetype means that MYPROG is a protected file and can't be deleted. (Protected files are described in more detail later.)

Ten file entries are shown at a time, and you advance to the next ten by pressing any key. (Press the cursor-up key to move back a screen.) When all the files have been displayed, pressing any key returns you to the main menu. To abort the display at any time, press the asterisk (*) key.

When you ask for a directory display, Disk Keeper reads the disk's name and compares it to the name of the last disk it read. If the names match and Disk Keeper thinks you haven't done anything to the directory in the meantime (such as scratching a file), the program saves time by not bothering to read the rest of the directory. It assumes that the file information it read the first time is still valid and uses it again.

Make Disk Label. Choosing this menu option allows you to make hard-copy listings of the information displayed by option 1. You are asked to choose a label format:

```
1) JACKET INSERT
2) FULL JACKET
```

If you choose format 1, the program sends to the printer an alphabetized listing that you can cut out and slip into the disk jacket along with the

RUN It Right

C-64; C-128 (in C-64 mode)
Disk drive

Caution: Do not use the Protect File feature with RUN Script files.

Photograph by Edward Judice

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disk. If you have trouble keeping the label and the disk together, or if the disk jacket itself is becoming worn, you can choose format 2 instead. This produces a directory listing that you cut out and fold into a brand new disk jacket, with the filenames printed right on the front! Assembling the jacket is easy. Simply cut along the outside lines only, and fold as shown below.

Fold flap A at line 1. Fold flaps B and C at lines 2 and 3. Secure the flaps in the back with Scotch tape or glue. Warning: if you use glue to secure the flaps, make absolutely sure the glue is dry before you put a disk in the jacket.

After specifying the output format, you are asked to supply an optional label string of up to 24 characters. Type in any characters you like, and they will appear on the listing next to the disk name.

If you have been reading *RUN* for a while, you may notice that the disk label output for the jacket insert is very similar to the output produced by my disk label utility published in the April 1984 issue ("Calling Disk Directories to Order"). There are a few differences, however.

The older program does not print the two-character disk ID. Also, Disk Keeper uses a completely different method of reading the directory, and the sort is now written in machine language and is *much* faster. For a disk with 45 files on it, Disk Keeper reads and sorts the directory three times faster than the previous version! In addition, Disk Keeper doesn't use any Commodore-specific graphics characters when printing labels, so it's compatible with a wider range of printers.

Disk Keeper assumes that your printer is device #4 on the serial bus. If you are using a different device number for your printer, change the value assigned to the variable PR in line 110 of the program. (Don't forget to save your modified version.) Also, Disk Keeper assumes that your printer prints in standard pica type. If you have a printer that uses the smaller, elite typeface (such as Commodore's 1526), change from 0 to 1 the value assigned to the variable "Elite" in line 110. (Failure to do this will produce disk jackets that are too small if you choose format option 2.)

Disk Keeper prints its border and separator lines using the hyphen for horizontal lines and the colon for vertical lines. Depending on the graphics set of your printer, you might like to experiment by changing these to some other characters. This is easily done by changing the values assigned to the variables A$ and B$ in line 110. If you have a Commodore printer, try setting A$ = CHR$(192) and B$ = CHR$(221).

Clean Up Disk. After you have been using a disk for a while, it begins to fill up. A lot of the files eventually become obsolete. When you choose this menu option, Disk Keeper reads the disk directory. It then displays each filename in turn, asking if the file is to be deleted.

After you are asked about all the files on the disk, Disk Keeper goes through and deletes the ones you specified. Before the mass deletion starts, you are also asked if you want to validate the disk. If you answer Y, the disk is validated after the files have been scratched.

You can abort and return to the main menu without deleting any files by pressing the return key in response to any question before the deletion process actually begins. Also, once you have specified some files for deletion, you can skip the "Delete This File?" question for the rest of the files on the disk by typing in an asterisk in response to the prompt.

Protect File. (See caution, p. 34.) A little-known feature of the disk operating system is the ability to protect a file so that it can't be accidentally deleted by the Scratch command. You need only type into the input window the name of the file you want to protect and press the return key. Protected files show up in the directory with a "<" next to the filetype.

Unprotect File. Once a file has been protected with the Protect File option above, it can't be deleted (scratched) until it has been "unprotected." This option prompts you for the name of the file to unprotect, and turns the protect bit off in the directory.

Rename Disk. Although it is easy to change the name of a file using normal DOS commands, there is no regular DOS command for changing the name of a disk. When you choose this option, the name of the disk currently in the drive is displayed, and Disk Keeper prompts you for a new name. Type into the input window whatever new name you wish and press the return key. The disk will be renamed.

Format New Disk. Before a new disk can be used in the Commodore 1541 disk drive, it must be formatted. This involves assigning the disk a name and a two-character ID. (The disk ID is written onto every track and sector during the formatting process.) When you choose this menu option, Disk Keeper prompts you first for a name and then for a two-character ID for the new disk. You are warned that formatting the disk will destroy any existing files on it.

You are then asked if you wish to proceed; the disk will be formatted only if you answer Y to the question. (Note: When choosing a disk ID, be sure to select two characters you haven't used as an ID for any of your other disks. If DOS sees two disks with the same disk ID, it may mistakenly assume that the two disks are the same disk, with disastrous results to the files thereon.)

Send Disk Command. This option allows you to send to the disk drive any DOS command of your liking. You simply type the command into the input window and press the return key. Disk Keeper sends the command and then reads the error channel and displays the disk status. For example, to scratch a file named "OLD-PROG" from the disk, you would simply type:

```
S0:OLD-PROG
```

and press the return key.

Exit. Choosing this menu option allows you to exit from Disk Keeper and returns you to Basic.

Well, that's all there is to using Disk Keeper. The rest of this article is devoted to explaining some of the more interesting technical features of how the program works. The program itself is long, so the subsequent discussion will focus on those parts most likely to be of use to you in your own programming efforts.

Reading the Disk Directory

The heart of Disk Keeper is the routine that reads the disk directory. Before you see how to do this, you must first understand how information is stored on a disk.

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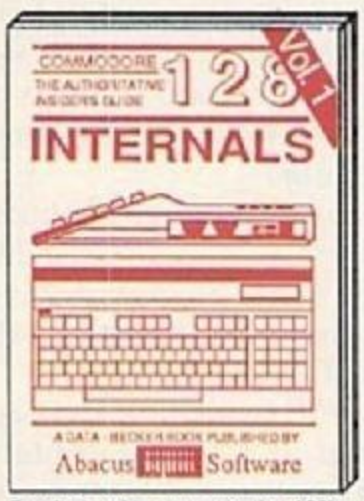

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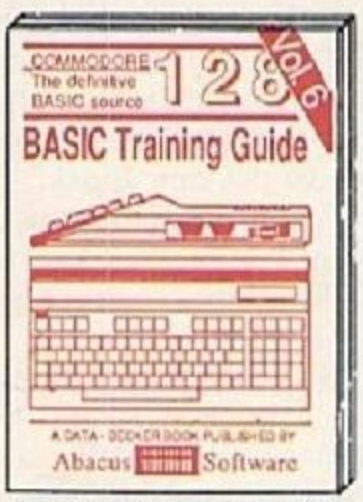

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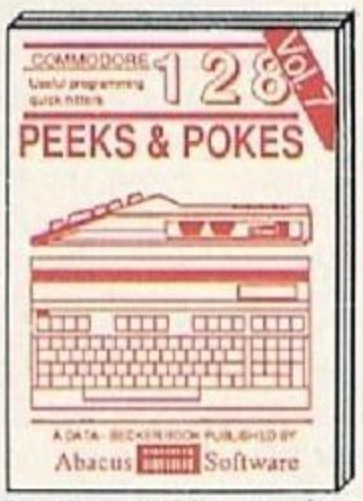

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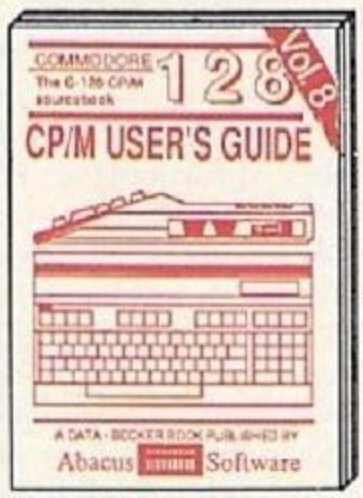

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A disk is organized into tracks and sectors. The surface of the disk is like a circular race course. The course is divided into lanes, which are the tracks of the disk. Each lane is divided into crosswise slices called sectors (or blocks), each capable of holding 256 characters of data. The sectors on each track are numbered starting with 0 (the "starting line"), so it's possible to uniquely identify any block on the disk by its track and sector number.

Most of the blocks on the disk are available to hold programs or files. Near the middle of the disk, however, some sectors are set aside to hold information about the files the disk contains. These special-purpose blocks make up the directory. The first directory block is always at track 18, sector 0, and it contains header information, such as the name of the disk, and a "map" of which sectors on the disk have been used.

The other sectors on track 18 hold information about the actual files themselves. The first such sector describes the first eight files. If there are more files, the first two bytes of the block contain the track and sector of the block containing the directory information for the next eight files, and so on.

A file entry in the directory contains 32 characters of data, such as the file's name, what sort of file it is and the track and sector of the block where it begins. Disk Keeper reads the directory by examining the appropriate disk blocks. Let's see how it's done by stepping through a short Basic program that prints the names of all the files on a disk.

The following sample program has been simplified from the way Disk Keeper actually reads the directory, in order to make the underlying principles easier to understand.

```
10 CLOSE15 : OPEN15,8,15,"I0:"
20 CLOSE3 : OPEN3,8,3,"#"
30 PRINT#15,"B – R:3,0,18,1"
40 PRINT#15,"B – P:3,0"
50 GET#3,T$ : GET#3,S$
60 T = 0 : IF T$< >"" THEN T = ASC(T$)
70 S = 0 : IF S$< >"" THEN S = ASC(S$)
80 FOR J = 0 TO 7 : REM LOOP 8 TIMES
90 PRINT#15,"B – P:3";J*32 + 2
100 GET#3,X$ : IFX$ = ""THEN 150
110 PRINT#15,"B – P:3";J*32 + 5
120 N$ = "":FORK = 1TO16
130 GET#3,X$ : N$ = N$ + X$
140 NEXT K : PRINT N$
150 NEXT J
160 IF T$< >"" THEN PRINT #15,
    "B – R:3,0";T;S : GOTO 40
170 CLOSE3 : CLOSE15 : END
```

Line 10 opens the disk command channel and initializes the drive. Line 20 then opens an input channel to the disk, which also causes the disk drive to set aside some internal buffer space. Now it's time to access the first block of file information in the directory. Line 30 sends to the disk through the disk-command channel a Block Read command, which tells the disk to read the block at track 18, sector 1, and store it in the internal buffer associated with channel 3 that was opened earlier.

Associated with each disk buffer is a "pointer," which indicates the next byte of the buffer to be accessed. Line 40 sets this pointer to 0 (the beginning of the block). Line 50 reads the first two bytes of the buffer, storing them in the variables T$ (track) and S$ (sector), respectively. These bytes tell the program the track and sector of the *next* directory block.

The program converts T$ and S$ to their numeric equivalents on lines 60 and 70, storing the results in T and S. (The program will make use of T and S later, but, for now, the information in the current directory block is the main concern.)

Each file entry in this directory block contains a status byte, the length of the file, the filename and some other information. The program now loops through the eight file entries in this block by positioning the buffer pointer to the beginning of each file entry and then getting the appropriate information.

Line 80 begins a loop that will execute eight times, once for each file entry in this sector. Each file entry is 32 bytes long, and the first one starts two bytes from the beginning of the block. (Remember that bytes 0 and 1 are the track and sector of the next directory block.)

Line 90 positions the buffer pointer to the file entry identified by the variable J. The first time through the loop, J is equal to 0, so the pointer is set to 0*32 + 2, or byte 2. This is the first byte of the first file entry. The next time through the loop, J will be equal to 1, and the pointer will be set to 1*32 + 2, which is 32 bytes further into the sector and where the information for file 2 is stored. This process continues for all eight file entries in the block.

Line 100 reads the first byte of the file entry and checks to see if it is a null string. If it is, it means there is no file information in this entry (perhaps the file has been deleted), so the program goes to the end of the loop at line 150 and continues on to the next file entry.

If X$ is not null, then this is a valid file entry and the program will proceed to read the filename. The name is stored beginning three bytes further into the file entry, so line 110 sets the buffer pointer to point to the first byte of the name. The program then sets the variable N$ to the null string and loops 16 times. (A filename can be up to 16 characters long.) For each iteration of the loop (line 130), the program reads a byte of the filename and adds it on to the end of N$. When the loop terminates (line 140), N$ contains the filename, and it gets printed.

The program will stay in the outer For loop eight times, once for each file entry in this directory block. When it is finished, it's time to read the next directory block, if there is one.

Recall that the first thing the program looked at in the current block was the track and sector of the next one, which was saved as T and S. If T is not equal to 0, there is another block to be read, so line 160 uses the Block Read command to read that sector into the disk buffer, and then branches back to line 40 to begin the process of extracting the information about the files in the new block.

The program continues looping in this fashion until it has worked its way through all the blocks containing directory information.

That's basically how the disk accessing portion of Disk Keeper works. Now let's look at a couple of other subroutines that may be useful for you to use in your own applications.

The Sort

After Disk Keeper reads the directory and stores the names of the files in the array D$, it sorts them into alphabetical order. Since sorting is a relatively time-consuming chore in Basic, I elected to write a machine language sort. This sort routine can be easily adapted to your own program.

The sort works only on string arrays. String arrays in Basic are stored with three bytes for each element of the array. The first byte tells how long the element is, and the other two bytes make up a pointer to the text of the string in string memory. The sort is fast because it doesn't move the actual strings around to get them in the right order; instead, it moves the pointers.

Here's how to integrate the sort subroutine into your own programs.

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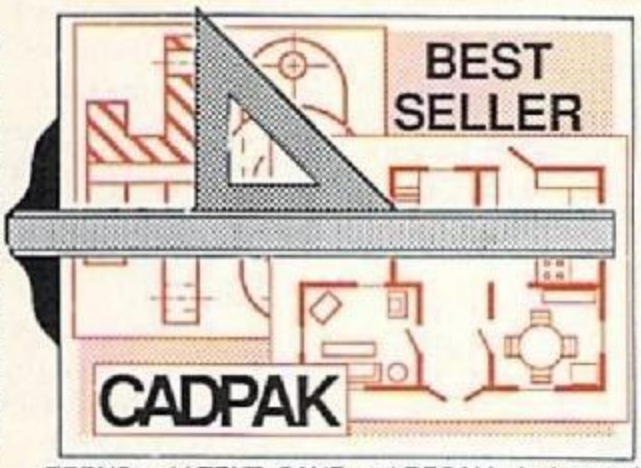

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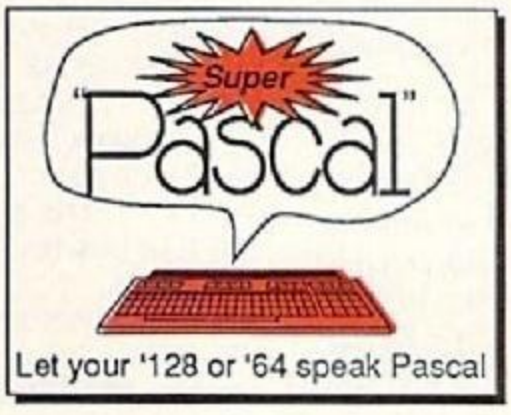

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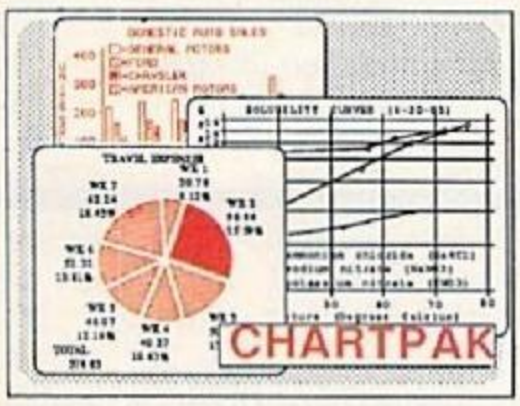

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First, you must include the Data statements, which are numbered from 10000 to 10110 in Disk Keeper. (If you wish, you may renumber these lines in your own program.) The values in those Data statements are the machine language instructions that make up the sort subroutine, which must reside at locations 49152 to 49364 in RAM.

Your Basic program must first Poke the instructions into the proper place in memory before the sort can be used. This is accomplished with the following Basic statements:

```
10 C=0 : FOR J=49152 TO 49364
20 READ N : C=C+N : POKE J,N
30 NEXT : IF C<> 29842 THEN PRINT
   "ERROR IN DATA" : END
```

The subroutine is designed to sort the first array it encounters in your program. So, if you want to sort the array X$, you must make sure that the very first DIM statement executed in your program is for X$. For example:

```
1 DIM X$(100)
```

The sort subroutine sorts by default, beginning with the first character of each string. If you would like the sort to begin at some other character position, you can make it do so by Poking the offset of the first character to be considered in the sort into location 49248. Disk Keeper, for example, builds its array of filenames with the size of the file in front of the name, like this:

```
100 MYFILE        SEQ
```

Since the array is to be sorted by program name and not by program size, the first character looked at during the sort should be the fifth character, not the first. The fifth character is offset four characters from the beginning of each string, so you would Poke 49248,4 before calling the sort subroutine.

The sort subroutine performs the following Poke after Poking the rest of the subroutine into RAM:

```
POKE 49248,4
```

The last thing you must do before calling the subroutine is to let it know how many values it will be sorting. This number must be Poked into RAM locations 49366 and 49367 in standard low-byte, high-byte format. Below is a demonstration program that shows you all of these parts put together:

```
1 DIM X$(400) : REM ARRAY TO BE
  SORTED
10 C=0 : FOR J=49152 TO 49364
20 READ N : POKE J,N : C=C+N : NEXT
30 IF C<>29842 THEN PRINT "ERROR
   IN DATA!" : END
35 POKE 49248,0 : REM SORT ON FIRST
   CHARACTER
40 N=0 : PRINT "TYPE IN WORDS TO BE
   SORTED."
50 PRINT "TYPE 'END' TO QUIT."
60 INPUT A$ : IF A$="END" THEN 80
70 N=N+1 : X$(N)=A$ : GOTO 60
80 REM NOW CALL SORT
90 GOSUB 500
100 PRINT"THE SORTED WORDS ARE:"
110 FOR J=1 TO N : PRINT X$(J) : NEXT
120 END
490 REM INVOKE MACHINE LANGUAGE
   SORT
500 N2=INT(N/256) : N1=N-256*N2
510 POKE 49366,N1 : POKE 49367,N2 :
   REM N SORT VALUES
520 SYS 49152 : RETURN
10000 DATA...
```

To save space here, the Data statements necessary to complete the program are not shown (statements 10000–10110 of Disk Keeper).

The Input Window Subroutine

Another subroutine you may find useful is the one Disk Keeper uses to input strings. It creates an input window on the screen, then flashes the cursor and inputs a string of characters, making sure you stay within the confines of the window. When you press the return key, the subroutine ends, with the string you typed stored in the variable S$. Before the subroutine is called, the following variables must be set up:

R = screen row number
C = screen column number
W = width of input window

Then when you call the subroutine, the input window will be displayed on the screen at row R, column C, and it will be W characters wide. (Row and column numbering begins with 0, so row 0, column 0 is the upper-left corner of the screen.)

To use the subroutine, all you have to do is include in your program Disk Keeper lines 8000–8110 and line 9000. Now suppose you wanted to input a string of up to 12 characters with the input window near the center of the screen. You could do this with the following Basic statement:

```
W=12 : R=12 : C=13 : GOSUB 8000
```

When the program returns from the Gosub, S$ will contain the string that was typed into the window.

I will be happy to answer any questions you may have about these subroutines or any other aspect of Disk Keeper (please enclose a self-addressed stamped envelope). R

Address all author correspondence to Michael Broussard, 13136 Lazy Glen Court, Herndon, VA 22071.

Listing 1. *Disk Keeper program.*

```
1ØØ REM F$ AND D$ MUST BE FIRST
    TWO PROGRAM VARIABLES!
                          :REM*12Ø
11Ø F$="":DIMD$(2ØØ),D%(2ØØ):PR=
    4:ELITE=Ø:A$="-":B$=":"
                          :REM*242
12Ø POKE5328Ø,Ø:POKE53281,Ø:FORK
    =1TO8Ø:BL$=BL$+" ":NEXT:BB$=
    MID$(BL$,1,9)         :REM*144
13Ø DIMTP$(4):TP$(1)=" SEQ":TP$(
    2)=" PRG":TP$(3)=" USR":TP$(
    4)=" REL"             :REM*4Ø
14Ø DIME$(2):E$(Ø)="":E$(1)="{2
    SPACEs}":E$(2)="{3 SPACEs}"
                          :REM*174
15Ø GOSUB91ØØ:R=12:C=7:GOSUB9ØØØ
    :PRINT"PLEASE WAIT--INITIALI
    ZING";                :REM*118
16Ø J=Ø:FORK=49152TO49364:READN:
    J=J+N:POKEK,N:NEXT:POKE49248
    ,4                    :REM*132
17Ø IFJ<>29842THENPRINT"ERROR IN
     DATA STATEMENTS 1ØØØØ-1Ø11Ø
    :END                  :REM*234
18Ø J=Ø:FORK=828TO866:READN:J=J+
    N:POKEK,N:NEXT        :REM*124
19Ø IFJ<>6665THENPRINT"ERROR IN
    DATA STATEMENTS 2ØØØØ-2ØØ2Ø:
    END                   :REM*1Ø2
2ØØ J=Ø:FORK=5ØØØØTO5ØØ98:READN:
    J=J+N:POKEK,N:NEXT    :REM*46
21Ø IFJ<>14887THENPRINT"ERROR IN
     DATA STATEMENTS 3ØØØØ-3ØØ5Ø
    :END                  :REM*5Ø
22Ø GOSUB9ØØØ:PRINTBL$    :REM*13Ø
23Ø GOSUB91ØØ:GOSUB 92ØØ:REM*12Ø
24Ø ON X GOTO65ØØ,3ØØØ,85ØØ,71ØØ
    ,72ØØ,75ØØ,55ØØ,5ØØØ,9999
                          :REM*92
3ØØØ GOSUB91ØØ:PRINTTAB(12)"{CRS
     R DN}MAKE DISK LABEL":GOSUB
     95ØØ:IFER>19THEN23Ø :REM*57
3Ø1Ø PRINTTAB(12)"{CRSR DN}1) JA
     CKET INSERT"         :REM*125
3Ø2Ø PRINTTAB(12)"2) FULL JACKET
     {CRSR DN}"           :REM*179
3Ø3Ø PRINTTAB(11)"CHOOSE FORMAT:
     {4 SPACEs}{2 CRSR LFs}";:GO
     SUB9Ø9Ø:W=1:GOSUB8ØØØ:X=VAL
     (S$)                 :REM*57
3Ø4Ø IFS$="1"ORS$="2"THEN3Ø7Ø
                          :REM*249
3Ø5Ø IFS$=""THEN23Ø       :REM*73
3Ø6Ø PRINT:PRINTTAB(4)"{CTRL 9}C
     HOOSE A NUMBER BETWEEN 1 AN
     D 2{3 CRSR UPs}":GOTO3Ø3Ø
                          :REM*185
3Ø7Ø G=VAL(S$)-1          :REM*75
3Ø8Ø PRINTTAB(4)"{CRSR DN} TYPE
     IN OPTIONAL LABEL STRING{2
     SPACEs}":R=14:C=8:W=24:GOSU
     B8ØØØ                :REM*25Ø
3Ø9Ø L$=S$:FF=1           :REM*86
31ØØ GOSUB9Ø9Ø:PRINTTAB(11)"{2 C
     RSR DNs}{CTRL 9}READING DIR
     ECTORY":GOSUB6ØØØ    :REM*246
311Ø GOSUB94ØØ:POKE781,R:SYS828:
     PRINTTAB(16)"{2 CRSR DNs}{C
     TRL 9}PRINTING"       :REM*168
312Ø CLOSE4:OPEN4,PR:X$="":FORK=
```

Continued on p. 80.

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Bootmaker 128/64

By BILL PYTLOVANY

One of the most refreshing features of the Commodore 128 is its ability to automatically load and execute specified C-128 programs that are on your disk. An example is the CP/M system disk packaged with the 128; you need only turn on the computer with this disk in the drive, and the CP/M operating system will be automatically activated. With some modification, you may apply this autoboot function to any disk used on the C-128.

The accompanying program, Bootmaker 128/64 (Listing 1), permits you to use this special feature on your C-64 programs. And, with it, you no longer have to press down your Commodore key or type GO64 when powering up. The program works with the 1571, 1541 and other Commodore-compatible disk drives.

For those of you who appreciate the 128-mode autobooting feature, you'll love this program. Now you can autoboot your 64-mode programs, too—simply by turning on your 128.

What It Does

Bootmaker 128/64 performs two operations. First, it creates what is called a boot sector on track 1/sector 0 of your disk. If your disk drive is turned on when the C-128 off/on switch is activated or when the C-128 reset button is pushed, then this boot sector is checked for program information. Bootmaker 128/64 places in this sector the information needed to load a program called BOOT64.

Second, it performs the actual creation of the P1BOOT64 program on your disk. This machine language program contains the data required to switch the C-128 into C-64 mode, while still retaining the name of the program you wish to be loaded and executed.

How to Use It

Just load Bootmaker 128/64 into your C-128 computer in C-128 mode (in either 40- or 80-column) and run it. The program will instruct you to insert your C-64 disk and prompt you to enter the name of the C-64 program you wish to boot. After typing in the name of the program and pressing the return key, the program will run for about 10–15 seconds while it displays the phrase "creating BOOT SECTOR" followed by "saving P1BOOT". It will then tell you when its operation has been completed, and you may test your newly bootable disk by pressing the reset button.

Sit back and watch. In a few seconds, if everything has been typed correctly, your computer will switch to 64 mode. You will see the 64 start-up screen and a message from the authors as your specified 64 program automatically loads and runs.

Tips and Suggestions

After typing this program, try it first on a disk you can afford to lose—just as a precaution. You might take a newly formatted disk, put a copy of one of your C-64 programs on it and use it as a test.

Use extreme caution if you want to use the P1BOOT64 program on commercial programs. Many commercially produced disks may be damaged by writing any type of data to them. Make a working backup of your disk first!

Be sure you have a sufficient number of free blocks on your disk. If your disk is almost full, use a disk editor program to determine if track 1/sector 0 is free for use.

Use this program to autoboot a menu program such as those commonly available from on-line services or user group public domain libraries. (See *RUN*'s April issue for a C-64 menu program.)

So, instead of holding down the Commodore key or typing LOAD "whatever",8, get up out of your chair and s-t-r-e-t-c-h while your program loads. It really can't be beat! R

Bill Pytlovany is the SYSOP for the 128th Precinct on QuantumLink. His user name is Bill P1 if you'd like to contact him. You may also write to him at 7 Center St., Scotia, NY 12302.

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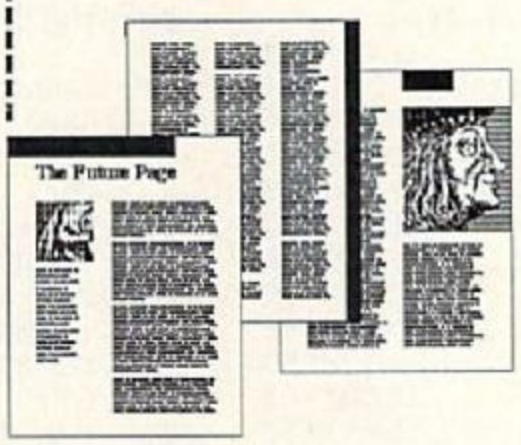

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Listing 1. *Bootmaker 128/64 program.*

```
30 REM BOOTMAKER 128/64                          :REM*38
40 REM FOR THE COMMODORE 128                     :REM*178
60 REM WRITTEN BY: DICK BEST & BILL PYTLOVA
   NY                                            :REM*92
100 SP$="P1BOOT"                                 :REM*116
110 FOR I=1 TO 4:Z1$=Z1$+CHR$(0):NEXT
                                                 :REM*212
120 FOR I=1 TO 21:Z2$=Z2$+CHR$(0):NEXT
                                                 :REM*30
130 FOR I=1 TO 16:S1$=S1$+CHR$(160):NEXT
                                                  :REM*2
140 SA=2831+LEN(SP$)                             :REM*182
150 SH=INT(SA/256)                               :REM*86
160 SL=SA-SH*256                                 :REM*78
170 CS$="CBM"+Z1$+SP$+CHR$(0)+CHR$(0)
                                                 :REM*228
180 CT$=CHR$(76)+CHR$(165)+CHR$(175)+"RUN"+
    CHR$(34)                                     :REM*186
200 COLOR0,7:COLOR4,7:COLOR5,2                   :REM*152
400 PRINT"{SHFT CLR}{2 CRSR DNs}PLEASE INSE
    RT YOUR 64 DISK"                             :REM*177
410 PRINT"{3 CRSR DNs}ENTER NAME OF PROGRAM
     TO BE BOOTED"                               :REM*19
420 INPUT CM$                                    :REM*45
430 OPEN15,8,15,"I0"                             :REM*53
440 GOSUB 500                                    :REM*163
450 GOSUB 1000                                   :REM*153
460 CLOSE15:DCLEAR                               :REM*191
490 PRINT"{CRSR DN}*OPERATION COMPLETED*":E
    ND                                           :REM*35
500 REM ----- BOOT CREATOR -----                  :REM*39
505 PRINT"{2 CRSR DNs}CREATING BOOT SECTOR.
    ..."                                         :REM*98
510 OPEN8,8,8,"#"                                :REM*63
520 PRINT#15,"B-P 8 0"                           :REM*26
530 PRINT#8,CS$;CHR$(162);CHR$(SL);CHR$(160
    );CHR$(SH);                                  :REM*38
540 PRINT#8,CT$;SP$;Z2$;                         :REM*180
550 PRINT#15,"U2:8 0 1 0"                        :REM*128
560 PRINT#15,"B-A 0 1 0"                         :REM*190
570 PRINT#8,CT$;SP$;Z2$;                         :REM*210
580 PRINT#15,"U2:8 0 1 0"                        :REM*158
590 CLOSE8:RETURN                                :REM*10
1000 REM{2 SPACEs}------ PROGRAM CREATOR --
     -----                                       :REM*179
1005 PRINT"{2 CRSR DNs}SAVING P1BOOT ....."
                                                 :REM*230
1010 OPEN2,8,2,SP$+",P,W":IF DS THEN 1090
                                                 :REM*97
1020 FOR I=1 TO 14:READY:PRINT#2,CHR$(Y);:N
     EXT                                         :REM*177
1030 SP$=LEFT$(SP$+S1$,16)                       :REM*80
1040 PRINT#2,SP$;                                :REM*150
1050 FOR I= 31 TO 219:READY:PRINT#2,CHR$(Y)
     ;:NEXT                                      :REM*124
1060 PRINT#2,CHR$(LEN(CM$));LEFT$(CM$+S1$,1
     6);                                         :REM*142
1065 FOR I= 1 TO 63:READY:PRINT#2,CHR$(Y);:
     NEXT                                        :REM*99
1070 PRINT#2,"ING ";CM$+"...";CHR$(0);
                                                 :REM*116
1080 E=DS:CLOSE2:IF E=0 THEN RETURN:REM*214
1090 PRINT"DISK ERROR ";DS$                      :REM*184
1100 CLOSE2:CLOSE15                               :REM*2
1160 DATA 1,8,208,36,240,34,254,2,49,53,58,
     254,17,34,34,58,158,50                      :REM*132
1170 DATA 48,52,57,0,0,0,169,227,133,1,169,
     47,133,0,162,8                              :REM*170
1180 DATA 189,62,8,149,1,202,208,248,142,48
     ,208,76,2,0,169,247                         :REM*170
1190 DATA 141,5,213,76,71,8,162,255,120,154
     ,216,142,22,208,32,163                      :REM*94
1200 DATA 253,32,80,253,32,21,253,32,91,255
     ,88,32,83,228,32,191                        :REM*84
1210 DATA 227,32,34,228,169,8,162,8,160,15,
     32,186,255,169,0,32                         :REM*226
1220 DATA 189,255,32,192,255,162,8,32,201,2
     55                                          :REM*38
1230 DATA 162,0,232,189,145,8,32,210,255,22
     4,5,208,245,32,204,255                      :REM*222
1240 DATA 169,8,32,195,255,208,5,85,48,62,7
     7,48,162,54,189,164                         :REM*164
1250 DATA 8,157,166,2,202,208,247,76,167,2,
     32,138,255,32,231,255                       :REM*116
1260 DATA 169,0,232,189,234,8,32,210,255,20
     8,247,169,2,162,8,168                       :REM*110
1270 DATA 32,186,255,173,218,8,162,219,160,
     8,32,189,255,169,0,32                       :REM*160
1280 DATA 213,255,134,45,132,46,32,142,166,
     32,96,166,76,174,167                        :REM*167
1290 DATA 13,10,17,17,32,73,32,76,79,86,69,
     32,77,89,32,67,45,49,50,56                  :REM*157
1300 DATA 33,33,33,13,17,17,66,89,32,68,73,
     67,75,32,66                                 :REM*253
1310 DATA 69,83,84,13,38,32,66,73,76,76,32,
     80,89,84,76                                 :REM*65
1320 DATA 79,86,65,78,89,13,17,17,17,66,79,
     79,84                                       :REM*189
```

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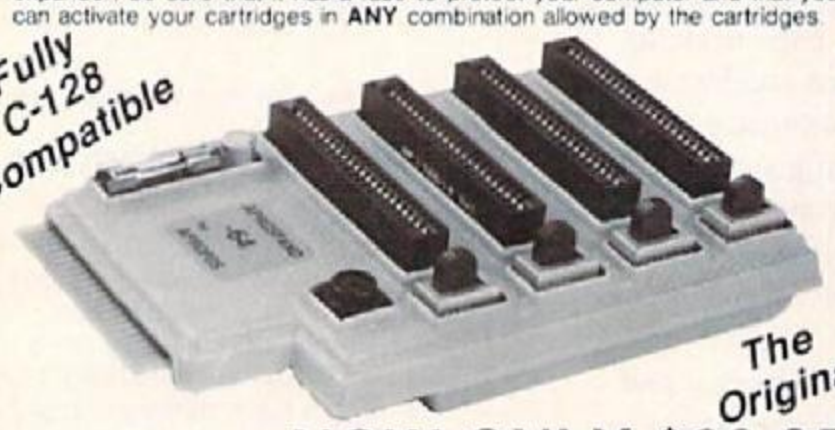

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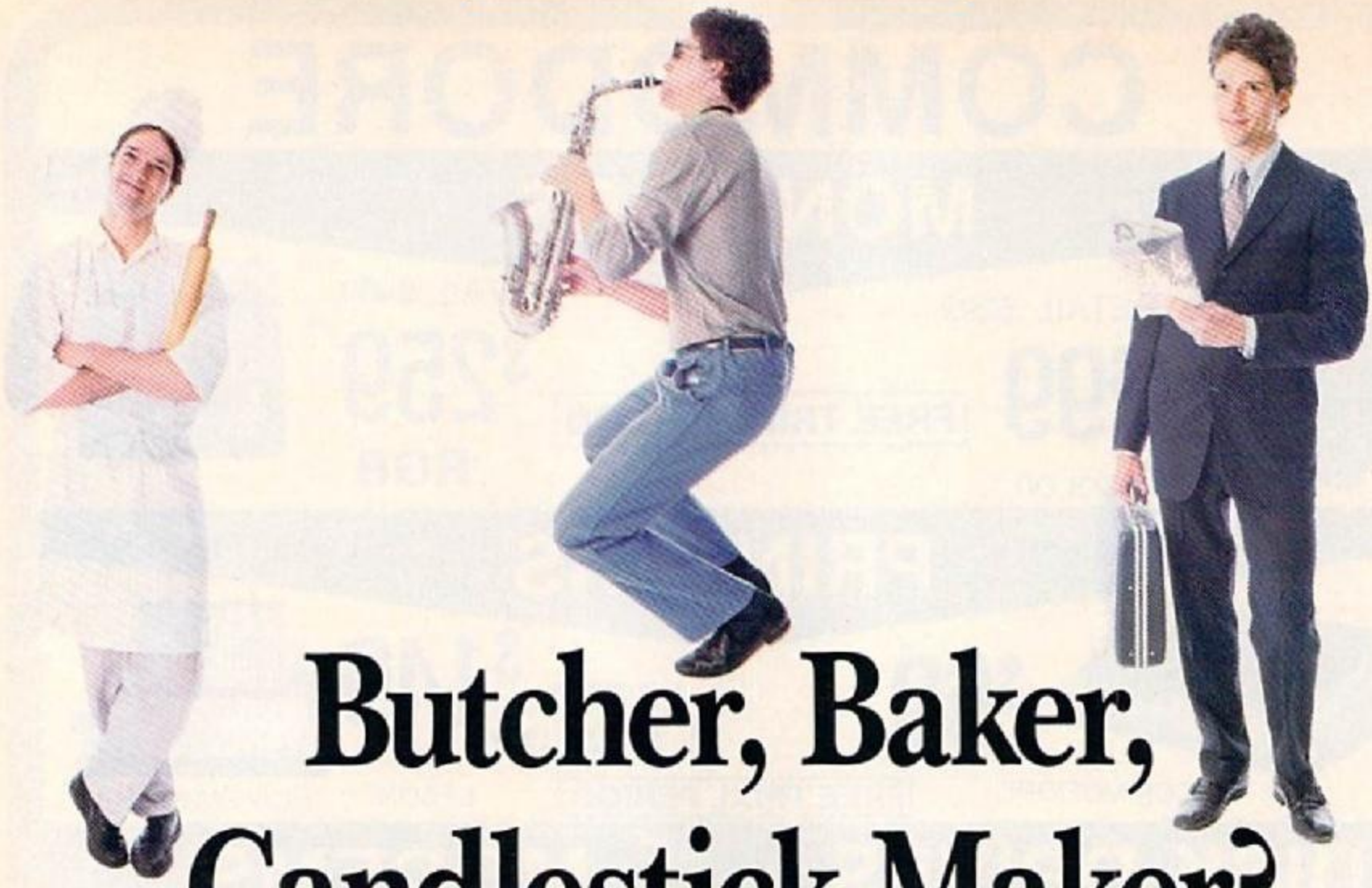

Butcher, Baker, Candlestick Maker?

Which career is best for you? These commercial programs can help you choose a career and improve your skills within your present job.

By CHRISTINE ADAMEC

The computer is ideal for systematically analyzing career information. Exciting, in-depth programs are available that help you choose a field of work or determine whether the one you've already selected is right for you—and then help you find a job!

And if you're already in your ideal career, you can use your computer to acquire communication, negotiation and decision-making skills for optimizing your career even further. Yes Virginia, such helpful programs are available right now.

I'll first review career software, then move on to programs designed to help you maximize your potential on the job.

Career programs require you to input information about yourself that is then matched against hundreds of career fields. This kind of program is very useful if you're a high school or college student or someone considering a career change.

Career Scan IV

Career Scan IV (National Educational Software Services, 1879 Locust Drive, Verona, WI 53593) is a two-disk program for the C-64 that includes a mind-boggling database of over 800 occupations. The program is easy to understand, and a search takes about 30 minutes.

You begin by selecting your area of interest—vocational or general. Vocational refers to such diverse subjects as home economics, marketing and agriculture, while general includes language, mathematics, chemistry, social studies and other such subjects.

Next, you're asked such questions as: Would you prefer a career that deals with 1. data; 2. people or animals; 3. things (machines, tools, etc.); or 4. ideas? You choose up to two.

What kind of working environment is important to you? Do you want clearly defined tasks with little or no pressure; tasks that require problem-solving methods? You have several other choices.

Would you prefer a job that employs your verbal, numerical, visual or physical-coordination abilities? And what kind of an environment would you *not* like—a job where there's mostly sitting, standing, walking or lifting and bending?

Of course, the amount of time you are willing to spend training for this occupation is important, too. You might like to be a brain surgeon, but don't really like the idea of attending school for several years beyond college. Therefore, a medical career wouldn't show up if you chose an option that limited your schooling.

What kind of outer environment are you seeking—city, country, small town?

Your final task will be to rate your answers, from very important to important to not important. Then comes the exciting part—the search!

Occupations are divided into 20 major groups, with as many as 122 occupations in the largest group, production work, and as few as ten in the smallest group, health-diagnosis and treatment practitioners.

Photograph by Ed Judice

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Once the program chooses a general group for you, you may search for specific career fields.

A good feature of this program is that you're told what the impact of high tech, social and economic trends on job tasks is likely to be—whether, for example, the tasks involved in a certain profession are expected to change much in the future.

You can also make a printout of your careers and find out in what standard occupational classification your career is and where you can find more information about it. For example, if you think you'd like to be an editor, you should read p. 159 in the *Occupational Handbook for 1984–85*.

What did I think? On the plus side, this program was easy to use and a lot of fun, providing solid information from which to work. It was thought-provoking and comprehensive, and I was impressed with the great number of careers in the database. It's a highly interactive program, and you can readily change any of your answers and run another search.

My chief misgiving was the price, which might be in line with what educational institutions pay, but, at $169, is pretty steep for an individual consumer. As a result, I recommend the program primarily for schools and unemployment offices—places where career information is important.

Overall, Career Scan IV is a very good start to a comprehensive career search, and I recommend it.

Career Directions

Career Directions (Jefferson Software, 723 Kanawha Blvd. East, Charleston, WV 25301) is another career program for the C-64. At the time of this writing, the program has yet to be released. However, I've seen the TRS-80 and Apple versions and am greatly impressed.

This program offers a database of nearly 500 careers and includes career assessment, analysis and exploration.

After you complete the career assessment, you enter career analysis, and the computer will print out a listing of careers with a numerical code for each one. If you want to search further (career exploration), type in a code and you'll receive additional information about any career in the database, whether it was selected for you or not. (Each career code is in the manual.)

Career Directions will retail for $89, an affordable price for many consumers.

I strongly recommend you ask your local high school or college to request review copies of either or both of these career-search programs. (Annual updates are available.) Also, keep in mind that there are several programs oriented strictly to job-searching, such as Compu-Job by Education Associates, Inc., of Frankfort, Kentucky. ($119 on the C-64.)

All right, you've found your ideal career. Now why not enhance that career with specialized programs designed to help with communication, negotiation and decision-making?

The Communication Edge

Effective communication is the topic of The Communication Edge (Info Designs, Inc., 445 Enterprise

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Court, Bloomfield Hills, MI 48013) for the C-64, C-128 and Plus/4. This program is part of a series that also includes Sales Edge, Management Edge and Negotiation Edge.

According to The Communication Edge's manual, this two-disk program will "help you evaluate the personalities, strengths and weaknesses of people in your meetings and provide specific tactics to listen accurately and speak persuasively."

First, you assess yourself. The computer asks you to agree or disagree with such statements as, "I take charge in most meetings," "I like working alone," "I desire feedback on my performance," etc.

Once that data is saved, you're ready to input information on your colleagues; the disk can save data on as many as nine people.

The final step is the analysis, which you can receive on the screen or on your printer. Analysis includes what you can expect from those you work with and specific tips on how to handle them most effectively.

What did I think? Initially skeptical, I was won over. I ran through four very different people, including one person I like, one I dislike and two about whom I feel neutral.

The program asks you a lot of questions about the people you're having analyzed, so you must know them fairly well (well enough to know, for instance, if he or she is shy, aggressive, insecure, etc.). The program is beneficial in that it forces you to think about your counterparts, consider their personalities. That's something we often don't do enough.

Regarding the "nice" person, I received such comments as, "known for her friendly, straightforward communication style." I also received some very good tips. For example: "You may find that Ms. X conforms to authority during discussions. . . prepare in advance for this conversation. Know your facts and figures." And other useful advice.

What about the person I didn't like? To my surprise, according to the program, we have something in common—and it does ring true.

"You both are reserved people who dislike much small talk. . . Ms. Y will probably be impatient to get to the point of your conversation." So, consequently, I should "establish a clear agenda before the conversation."

I should also expect Ms. Y to "take a tough stance" and was told to "stand your ground and avoid giving in to everything." I was also given various tactics to prepare for a win/lose confrontation, deal with anger, remember the facts and others.

I liked this program and see it as useful for both new entrants into the business world as well as for jaded "old hands." It's simple to run, yet you'll obtain sophisticated and practical advice. It stimulates you to think harder about your communication style, another factor in improving it. The program costs $79.95.

What about the person I didn't like? To my surprise, we have something in common.

The Negotiation Edge

In Info Designs' The Negotiation Edge for the C-64, C-128 and Plus/4, the goal is to anticipate "likely opponent maneuvers, implement alternative tactics and test their effectiveness."

This program is composed of two disks, but, like The Communication Edge, one of the disks is double-sided, so you get the equivalent of three disks.

You start with self-assessment and are prompted to agree or disagree with such questions as "Job disappointments don't bother me long," "I usually arrive early for an appointment," "I would like to be leader of my country," etc. You rate your opponent's traits, such as "blaming," "inquiring," "flexible," etc.

This program also uses situational questions, such as whether your opponent has a "shortage of time" or "feels a strong need to finalize an agreement" and whether "the power to control the proceedings is equally divided between us." In fact, this section makes me believe Negotiation Edge is even more valuable than Communication Edge. (They cost $79.95 each.)

What about bottom-line results? It took exceptionally long for my printer to complete my report; I thought the program had crashed or was in some kind of a loop.

However, it was worth the wait. I was given a general evaluation first. "You have strong ideas and tend to present them forcefully. Avoid pushing your proposals too aggressively with Ms. Z, as she is likely to be intimidated by such an approach." Instead, I should be low-key and non-threatening, and, if necessary, I should reschedule the meeting.

The program also provides an "anticipated counterpart position," "tactics and strategies" advice for during the negotiation and closing advice. For example, "organize your thoughts in writing," "appeal to prestige and authority" and others (these are explained in greater detail). Key points are summarized.

I liked The Negotiation Edge, found it provided practical and detailed advice on handling negotiations.

Creative Problem Solving

Creative Problem Solving (Harvsoft, PO Box 725, Kenmore, NY 14217) is for the C-64 and C-128. This program is much faster and simpler than previously described ones, and, at $29.95, it's also the least expensive.

Creative Problem Solving requires that you first state your problem. For example, you might want to know how you can more easily sell your house, market your product or better manage your time.

I decided my problem is that I need more free time. I was instructed to select factors or elements influencing or causing this problem, so I input such things as: my older two kids, the baby, poor scheduling, difficulty

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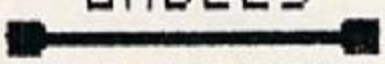

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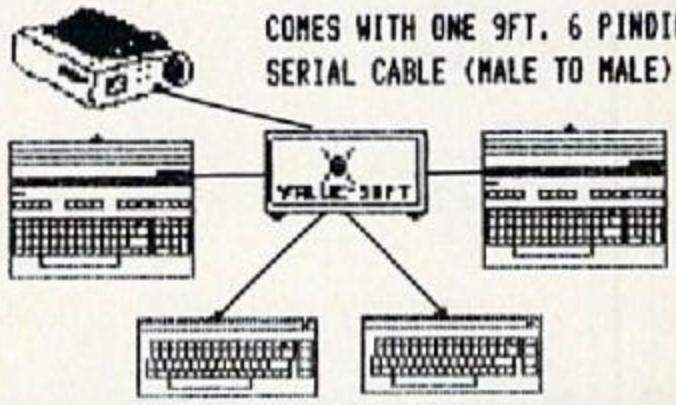

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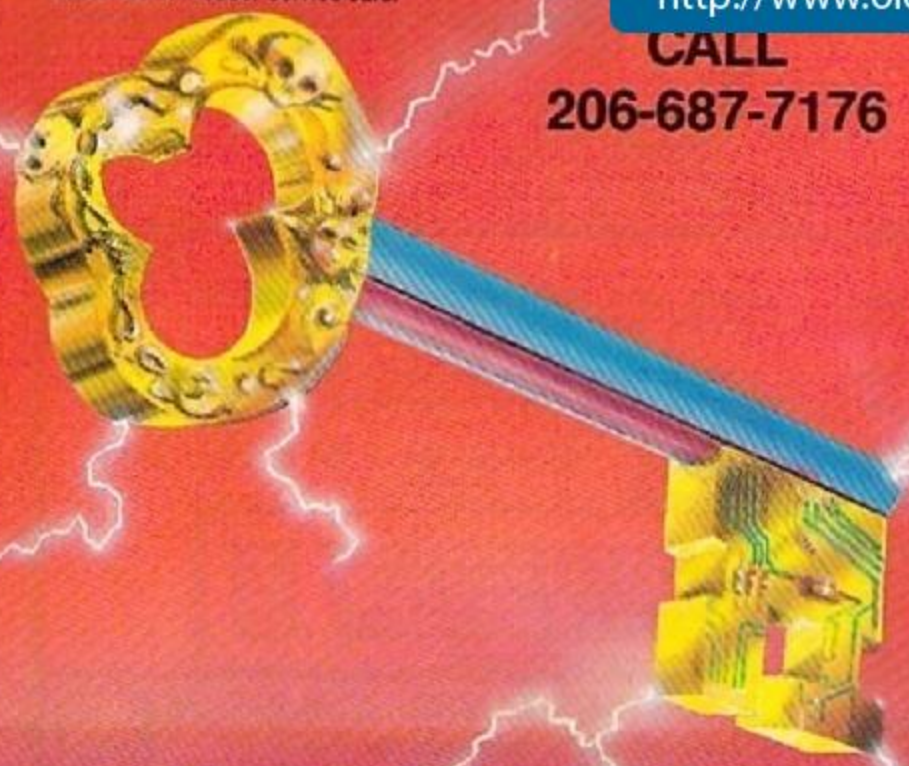

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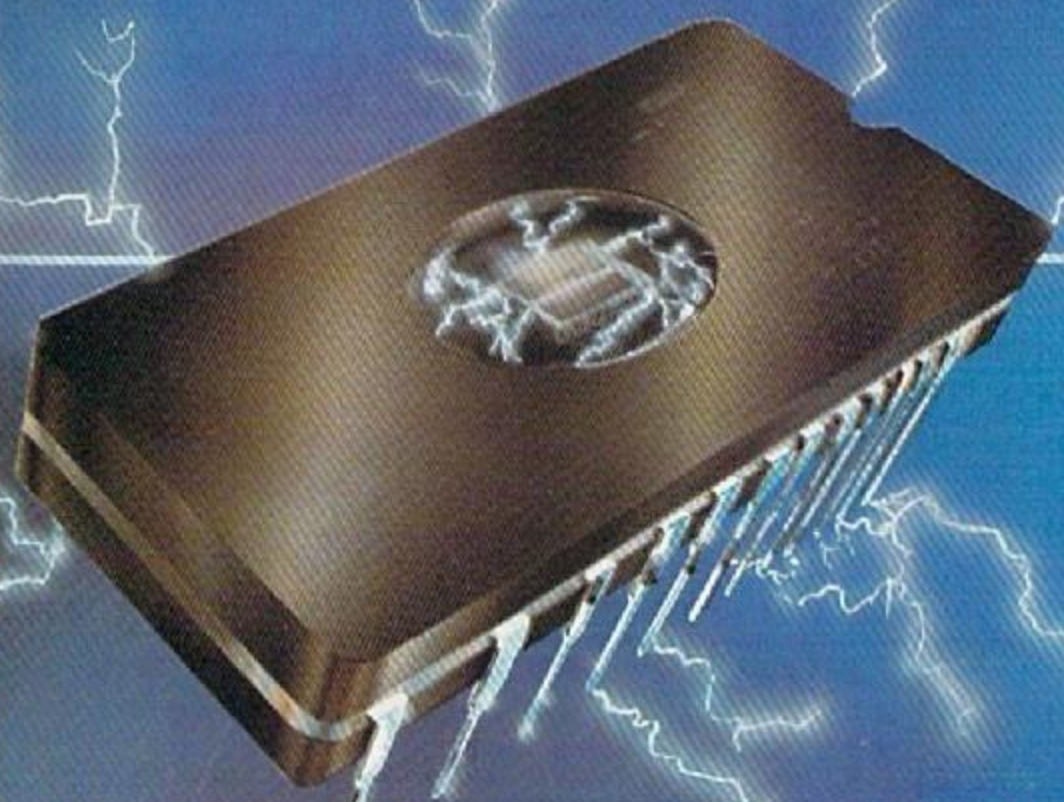

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- For maximum convenience and performance, MAGNUM LOAD is installed DIRECTLY in the circuit board. Generally, a socket has already been provided to make the operation easy, but occasionally some soldering may be required.
- Now you can give your 1541 disk drive "1571 speed."

The chart below compares ACTUAL MEASURED loading times.

PROGRAM	STAR DOS	REGULAR LOAD	MACH 5	FAST LOAD	MAGNUM LOAD
Pitstop II (EPYX)	?	144 sec.	43 sec.	41 sec.	31 sec.
Music Shop (BRODERBUND)	?	105 sec.	105 sec.*	105 sec.*	21 sec.
Hitchhiker's Guide to the Galaxy (INFOCOM)	?	70 sec.	70 sec.*	**	68 sec.*
On-field Football (GAMESTAR)	?	159 sec.	66 sec.	63 sec.	56 sec.
EASY FINANCE I (COMMODORE)	?	58 sec.	13 sec.	13 sec.	11 sec.

* = Will not fast load — defaulted back to regular load.
** = *Failed to load at all.*

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Rather than give you more exagerated claims about how many times faster our ROM chip is compared to the slower cartridge versions, a comparison chart is supplied listing MEASURED loading times.

Programed by Jim Drew

Program	Star Dos	Reg Load	Mach 5	Fast Load	MAGNUM LOAD
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For 1541 or MSD Version

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Add Some Character To Your C-64

Here's a program that lets you make custom characters the easy way.

By VITO SOLIMENE

A nice feature of the Commodore 64 is its ability to let you redefine the current character set. With this ability, you can program any of the keyboard letters, numbers or graphics symbols to represent your own designs. You can then very easily place these new designs into your own programs.

However, to make a custom character set this way, you have to sit down with a pencil and some graph paper and draw every character you want to modify; you must then add up the bits to form the character. Once this is done, you have to take the data and Poke it into character memory to see how it looks.

With my MAKECHARS program (Listing 1), you can easily create your custom character set without any tedious "pencil pushing" and immediately see the results.

The Program

When you first run Listing 1, the screen will clear and display the message that the 64 is in the process of copying the character set.

The program copies the entire character ROM (all 4096 bytes) into RAM. When I first wrote the program, I used Basic to do the copying. However, it took too long, so I wrote the copy routine in machine language. The copy routine takes the characters at 53248 ($D000) and copies them into 12288 ($3000). (Keep in mind that rerunning the program will cause the character set to be recopied.)

After this is done, a prompt will appear, asking you which character set you would like to edit. Answer by pressing the corresponding number. If you answer with an X, the program will end.

The next screen is known as the editing screen. This is where almost everything takes place. On the top of the screen, a message will appear ("XXX – YYY 'Q' TO QUIT 'H' FOR HELP CHAR#?"). The XXX is the lowest number allowed to be entered and the YYY is the highest. These numbers depend on the character set you picked earlier. This is known as the Prompt mode. A message at the bottom of the screen should appear to confirm this.

If you press H, a help screen will appear, giving a brief description of all the options available to you. If you enter Q, you'll be returned to the beginning of the program, where you can pick another character set to edit or quit the program.

Once you choose a number and press the return key, a box will be drawn, with the character you picked inside. The box is eight columns wide and eight lines high. Each line corresponds to one byte of the character shape, and each column corresponds to one bit in that byte. A few columns to the right of this box is the character you are currently working on, in its actual size. You are now in the Edit mode, and a message should appear at the bottom of the screen confirming this.

In this mode, there are a lot of features available to you. If at any time you forget them, press H in the Prompt mode. The features are:

Cursor controls. The cursor-control keys enable you to move a flashing cursor around in the box.

Asterisk key (*). When you press this key, an asterisk is placed at the current cursor location. Note: This will not advance the cursor in any direction.

RUN It Right

C-64; C-128 (in C-64 mode); printer optional

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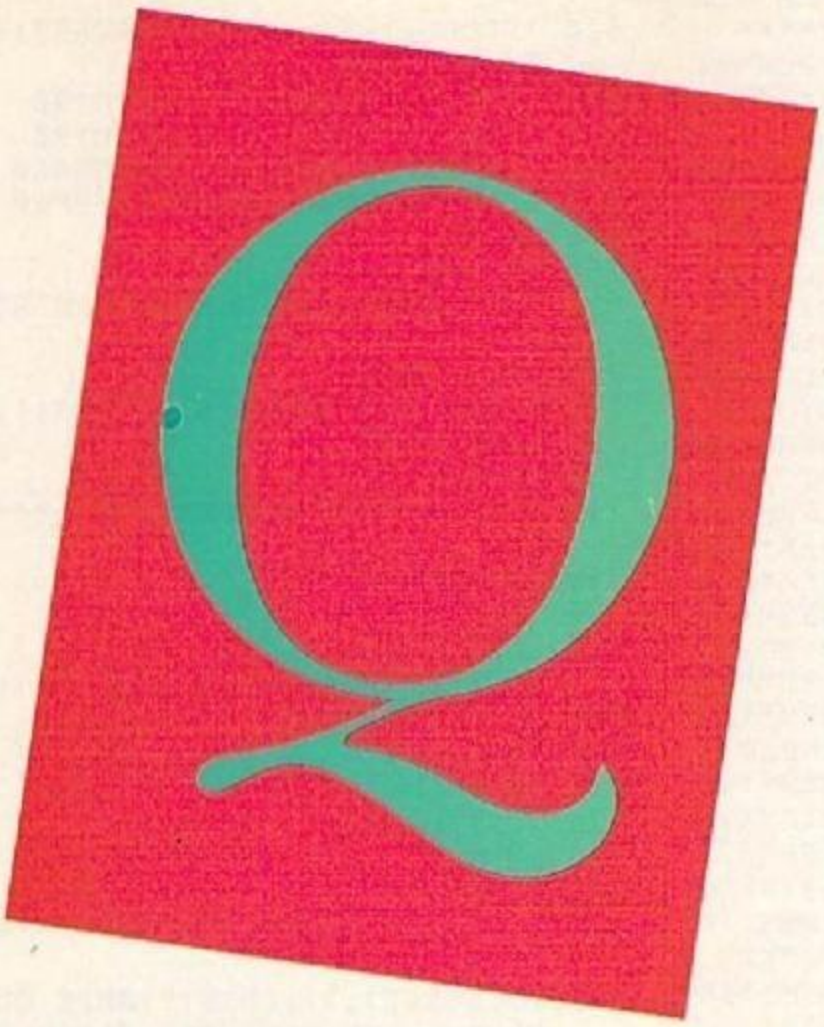

Space bar. When you press the space bar, a space is placed at the current cursor location. Like the asterisk, it does not advance the cursor in any direction.

CLR/HOME. Depressing this key doesn't change the character in any way; it just puts the cursor in the upper-left corner of the box.

Shift with CLR/HOME. If you simultaneously press the shift and CLR/HOME keys, the character box is cleared and your character erased.

CTRL 9. When you press the control key with the 9 key, the current character is reversed. Each asterisk becomes a space and each space becomes an asterisk.

N key. This advances you to the next character in numerical order without returning to Prompt mode.

P key. This is the exact opposite of the N command. It allows you to see the character before the one you are currently editing.

f1. Pressing this key while in the Edit mode causes the changes made in the enlarged character box to be transferred to memory and to be displayed. Note: Any alterations to the character will not be incorporated into the actual character until this key is pressed.

f3. When this key is pressed, it will return you to the Prompt mode.

f5. Pressing this key allows you to save to disk or tape the character set you're working on. Once you press this key, a message will appear at the top of the screen, asking for the device to which you want to save your file. After you have answered, another prompt appears underneath, asking you for the filename. If you pressed f5 by mistake, responding with an X returns you to the Prompt mode.

f6. Pressing this key allows you to load a character set from disk or tape. After you press f6, the screen clears, and a message appears, asking for the device from which to load your character file. The f6 feature has the same protection against accidental pressings as f5.

f7. Pressing this key allows you to print the data for the custom characters to screen or printer (you must instruct it by entering either S or P). If, at any time, you wish to stop printing the data, press any key. To restart the printing, press C, for continue. To stop printing, press X, and you'll be returned to the Prompt mode. Be aware that the first number in the Data statements should not be used, since it is the number of the character and is for reference only.

Note: If you are working on the reverse uppercase character set, for example, and decide to save your file, it will be reloaded in the place of the normal reverse uppercase character set. This is true of each of the other character sets as well.

What Now?

So, you have a list of Data statements—now, what do you do with them? I've included another program, Listing 2, which takes care of this problem. I call it a skeleton program. It contains all you need in order to use the Data statements, except, of course, the data, which you will provide. See Table 1 for a line-by-line explanation of Listing 2.

Address all author correspondence to Vito Solimene, 3750 Hudson Manor Terrace, Bronx, NY 10463.

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Listing 1. *MAKECHARS program.*

```
100 D$="{HOME}{20 CRSR DNs}"          :REM*222
110 GOTO1610:REM GO COPY CHARS**********
                                      :REM*94
120 DIMA(7):A(7)=128:A(6)=64:A(5)=32:A(4)=1
    6:A(3)=8:A(2)=4:A(1)=2:A(0)=1:P=42
                                      :REM*124
130 PRINT"{SHFT CLR}":POKE53272,21:REM GET
    CHARACTER #*******                :REM*32
140 PRINTD$SPC(14)"{CTRL 9}PROMPT MODE":PRI
    NT"{HOME}"RL"-"RH;"'Q' TO QUIT, OR 'H'
    FOR HELP"                         :REM*132
150 INPUT"CHAR #";C$                  :REM*246
160 IFLEFT$(C$,1)="Q"THENGOSUB1750:GOTO140
                                      :REM*234
170 IFLEFT$(C$,1)="H"THENGOSUB1940:GOTO140
                                      :REM*98
180 C=VAL(C$)                         :REM*198
190 IFC<RLORC>RHTHEN140               :REM*242
200 AD=12288+8*C                      :REM*46
210 PRINTD$;SPC(14)"{2 SPACEs}{CTRL 9}EDIT
    MODE{CTRL 0}"                     :REM*36
215 POKE53272,29                      :REM*181
220 FORI=0TO9:POKE1024+4*40+16-I,160:NEXT
                                      :REM*176
230 FORI=0TO9:POKE1024+13*40+16-I,160:NEXT
                                      :REM*226
240 FORI=0TO9:POKE1024+(4+I)*40+16,160:NEXT
                                      :REM*14
250 FORI=0TO9:POKE1024+(4+I)*40+7,160:NEXT
                                      :REM*248
260 REM DECODE CHAR TO USE IN MATRIX****
                                      :REM*203
270 FORI=0TO7                         :REM*87
280 X=PEEK(AD+I)                      :REM*149
290 B(0)=((XAND1)=0)+1                :REM*13
300 B(1)=((XAND2)=0)+1                :REM*47
310 B(2)=((XAND4)=0)+1                :REM*89
320 B(3)=((XAND8)=0)+1                :REM*147
330 B(4)=((XAND16)=0)+1               :REM*115
340 B(5)=((XAND32)=0)+1               :REM*93
350 B(6)=((XAND64)=0)+1               :REM*175
360 B(7)=((XAND128)=0)+1              :REM*181
370 FOR J=7TO0STEP-1                  :REM*229
380 V=32*(1-B(J))+42*B(J)             :REM*217
390 POKE1024+40*(I+5)+15-J,V          :REM*111
400 POKE55296+40*(I+5)+15-J,14        :REM*143
410 NEXT                              :REM*165
420 NEXT                              :REM*175
430 PRINTCHR$(142+128*(C>255))"{HOME}":POKE
    1232+40*3+20,C+256*(C>255)        :REM*223
440 POKE55296+8*40+28,14              :REM*147
450 QN=0:QO=0:PF=0:REM GET COMMAND*****
                                      :REM*101
460 P=PEEK(1232+QO):POKE1232+QO,P     :REM*127
470 GETM$:P=(POR128)-(PAND128):POKE1232+QO,
    P                                 :REM*97
480 P=(POR128)-(PAND128):POKE1232+QO,P:FORI
    =1TO50:NEXT:IFM$=""GOTO470        :REM*137
490 IFM$="{CRSR UP}"THENQN=QO-40      :REM*41
500 IFM$="{CRSR DN}"THENQN=QO+40      :REM*115
510 IFM$="{CRSR RT}"THENQN=QO+1       :REM*33
520 IFM$="{CRSR LF}"THENQN=QO-1       :REM*236
530 IFM$="{FUNCT 3}"THENGOTO140:REM F3 GET
    TO PROMPT                         :REM*128
540 IFM$="{FUNCT 1}"THENGOSUB740:GOTO450:RE
    M F1 COMPILE SHAPE                :REM*70
550 IFM$="{FUNCT 5}"THENGOSUB1070:GOTO140:R
    EM F5 SAVE A FILE                 :REM*222
560 IFM$="{FUNCT 6}"THENGOSUB860:GOTO140:RE
    M LOAD A FILE                     :REM*142
570 IFM$="{FUNCT 7}"THENGOSUB1270:GOTO140:R
    EM F7 DATA STATEMENTS             :REM*20
580 IFM$="{SHFT RETURN}"THENP=42:PF=1  :REM*14
590 IFM$=" "THENP=32:PF=1              :REM*2
600 IFM$="{HOME}"THEN450              :REM*140
610 IFM$="{SHFT CLR}"THENGOSUB690:GOTO450
                                      :REM*138
620 IFPEEK(197)=32ANDPEEK(653)=4THENGOSUB15
    10:GOTO450                        :REM*98
630 IFM$="N"THENC=C+1:GOTO190         :REM*180
640 IFM$="P"THENC=C-1:GOTO190         :REM*222
650 IFPEEK(1232+QN)=160THEN460        :REM*52
660 IFPFTHENPOKE1232+QN,P:PF=0        :REM*116
670 QO=QN                             :REM*74
680 GOTO460                           :REM*220
690 FORI=0TO7:REM CLEAR CHAR BOX*******
                                      :REM*88
700 FORJ=0TO7                         :REM*14
710 POKE(1024+40*(I+5)+(15-J)),32     :REM*202
720 NEXT:NEXT                         :REM*214
730 RETURN                            :REM*22
740 REM COMPILE SHAPE*****************
                                      :REM*170
750 FORI=0TO7                         :REM*56
760 T=0                               :REM*230
770 FORJ=0TO7                         :REM*85
780 X=PEEK(1024+40*(I+5)+(15-J))      :REM*229
790 IFX=32THEN810                     :REM*85
800 T=T+A(J)                          :REM*167
810 NEXT                              :REM*55
820 POKEAD+I,T                        :REM*245
830 NEXT                              :REM*75
840 RETURN                            :REM*133
850 REM LOAD FILE**********************
                                      :REM*151
860 POKE53272,21:PRINT"{SHFT CLR}LOAD FILE
    FROM {CTRL 9}T{CTRL 0}APE OR {CTRL 9}D{
    CTRL 0}ISK?";                     :REM*243
870 GETFD$                            :REM*233
880 IFFD$<>"D"ANDFD$<>"T"THEN870      :REM*161
890 IFFD$="D"THENFD=8:FW=3:FR$=",S,R":FW$="
    ,S,W":FR=FW                       :REM*249
900 IFFD$="T"THENFD=1:FW=1:FR$="":FW$="":FR
    =0                                :REM*61
910 PRINT:INPUT"NAME OF FILE TO LOAD";NF$:G
    OTO930                            :REM*255
920 GOTO1050                          :REM*1
930 IFNF$=""THEN910                   :REM*207
940 IFNF$="X"THENGOTO1050             :REM*251
950 OPEN1,FD,FR,NF$+FR$               :REM*207
960 INPUT#1,RL:INPUT#1,RH             :REM*73
970 IFSTTHENGOSUB2170:CLOSE1:GOTO910:REM*93
980 FORC=RLTORH                       :REM*181
990 AD=12288+8*C                      :REM*71
1000 FORI=ADTOAD+7                    :REM*33
1010 INPUT#1,XX                       :REM*117
1020 POKEI,XX                         :REM*139
1030 NEXT                             :REM*20
1040 NEXT:CLOSE1                      :REM*32
1050 PRINT"{SHFT CLR}":POKE204,1:RETURN
                                      :REM*50
1060 REM SAVE A FILE*******************
                                      :REM*140
1070 POKE53272,21:PRINT"{SHFT CLR}SAVE FILE
     TO {CTRL 9}T{CTRL 0}APE OR {CTRL 9}D{
    CTRL 0}ISK?";                     :REM*230
1080 GETFD$                           :REM*188
1090 IFFD$<>"D"ANDFD$<>"T"THEN1080    :REM*4
1100 IFFD$="D"THENFD=8:FW=3:FR$=",S,R":FW$=
    ",S,W":FR=FW                      :REM*204
1110 IFFD$="T"THENFD=1:FW=1:FR$="":FW$="":F
    R=0                               :REM*16
1120 PRINT:INPUT"FILENAME";NF$        :REM*148
1130 IFNF$=""THEN1120                 :REM*158
1140 IFNF$="X"THENPRINT"{SHFT CLR}":RETURN
                                      :REM*140
1150 OPEN1,FD,FW,NF$+FW$              :REM*168
1160 PRINT#1,RL:PRINT#1,RH            :REM*118
```

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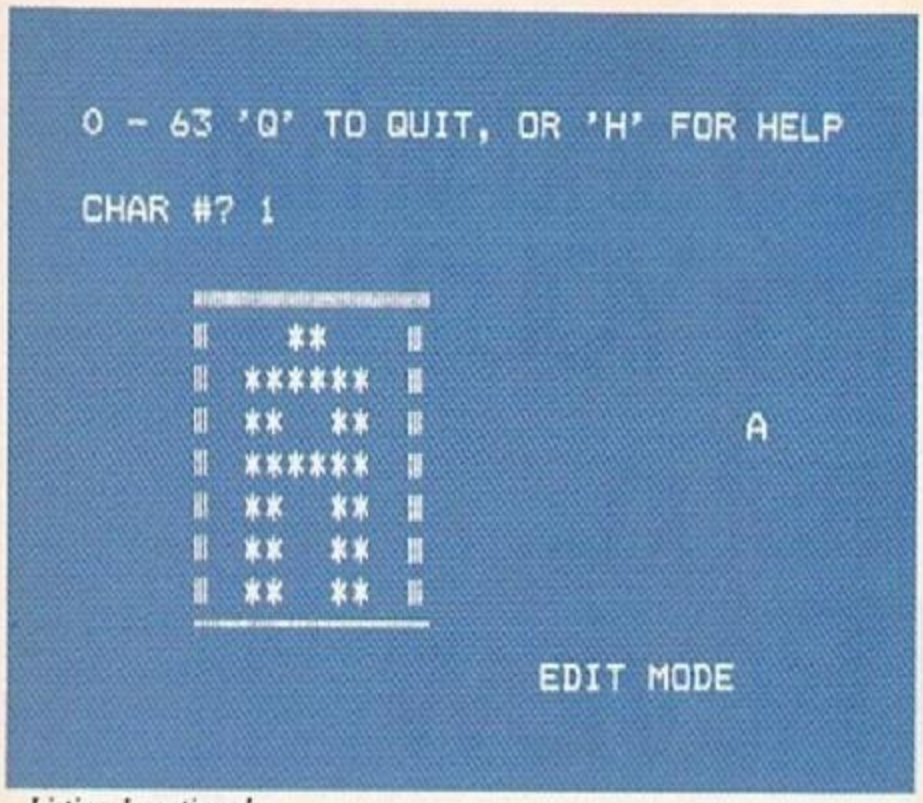

Listing 1 continued

```
117Ø IFSTTHENGOSUB217Ø:CLOSE1:GOTO112Ø
                                        :REM*168
118Ø FORC=RLTORH                        :REM*126
119Ø AD=12288+8*C                        :REM*16
12ØØ FORI=ADTOAD+7                      :REM*234
121Ø XX=PEEK(I)                          :REM*62
122Ø PRINT#1,XX                         :REM*152
123Ø NEXT                               :REM*22Ø
124Ø NEXT                               :REM*23Ø
125Ø CLOSE1:PRINT"{SHFT CLR}":RETURN
                                        :REM*236
126Ø REM PRINT OUT DATA*****************
                                         :REM*26
127Ø POKE53272,21:PRINT"{SHFT CLR}OUTPUT TO
     {CTRL 9}S{CTRL Ø}CREEN OR {CTRL 9}P{C
     TRL Ø}RINTER?";                    :REM*25Ø
128Ø GETDV$                             :REM*151
129Ø IF DV$<>"P"ANDDV$<>"S"THEN128Ø:REM*149
13ØØ IFDV$="S"THENDV=3                  :REM*241
131Ø IFDV$="P"THENDV=4                   :REM*57
132Ø CO=C:PRINT"{SHFT CLR}{CTRL 9}PRESS ANY
     KEY TO{6 SPACEs}STOP THE LISTING{CTRL
     Ø}":OPEN1,DV:CMD1                  :REM*43
133Ø FORI=1TO1ØØØ:NEXT                 :REM*229
134Ø FORC=RLTORH                         :REM*31
135Ø PRINT#1,"DATA";C;                  :REM*195
136Ø AD=12288+8*C                       :REM*187
137Ø FORI=ADTOAD+7                      :REM*149
138Ø XX=PEEK(I)                         :REM*233
139Ø PRINT#1,XX"{CRSR LF},";            :REM*173
14ØØ NEXT                               :REM*135
141Ø PRINT#1,"{CRSR LF} "                :REM*19
142Ø GETQ$:IFQ$<>""THEN147Ø              :REM*45
143Ø NEXT                               :REM*165
144Ø PRINT"{CTRL 9}PRESS 'X' TO GET BACK TO
     PROMPT{CTRL Ø}"                    :REM*143
145Ø GETZ$:IFZ$<>""THENCLOSE1:PRINT"{SHFT C
     LR}":RETURN                        :REM*123
146Ø GOTO145Ø                           :REM*95
147Ø PRINT"{CTRL 9}PRESS 'C' TO CONTINUE -O
     R-":PRINT"{CTRL 9}PRESS 'X' TO GET BAC
     K TO PROMPT"                       :REM*141
148Ø GETQ$:IFQ$="C"THEN143Ø             :REM*45
149Ø IFQ$="X"THENCLOSE1:C=CO:PRINT"{SHFT CL
     R}":RETURN                         :REM*67
15ØØ GOTO148Ø                           :REM*233
151Ø PRINT"{HOME}":REM RVS CHARACTER*******
     *                                   :REM*9
152Ø FORI=ØTO7                          :REM*61
153Ø T=Ø                                :REM*235
154Ø FORJ=ØTO7                           :REM*9Ø
155Ø X=PEEK(1Ø24+4Ø*(I+5)+(15-J))       :REM*234
156Ø IFX=32THENPOKE1Ø24+4Ø*(I+5)+(15-J),42:
     GOTO158Ø                           :REM*222
157Ø POKE1Ø24+4Ø*(I+5)+(15-J),32        :REM*118
158Ø NEXT                                :REM*6Ø
159Ø NEXT                                :REM*7Ø
16ØØ RETURN                             :REM*128
161Ø REM COPY CHARS*********************
                                        :REM*254
162Ø ML=12*4Ø96:CK=Ø:RESTORE:FORI=MLTOML+46
     :READA:CK=CK+A:POKEI,A:NEXT        :REM*52
163Ø IFCK<>7117THENPRINT"{CTRL 9}CHECKSUM E
     RROR{CTRL Ø}":STOP                 :REM*1Ø6
164Ø PRINT"{SHFT CLR}{4 CRSR DNs}-IN THE PR
     OCESS OF COPYING CHARACTER SET":PRINT"
     PLEASE WAIT."                      :REM*68
165Ø SYS(ML)                            :REM*22Ø
166Ø FORXX=1TO1ØØØ:NEXT                 :REM*14Ø
167Ø GOSUB175Ø:GOTO12Ø                  :REM*198
168Ø DATA 12Ø,169,51,133,1              :REM*2Ø6
169Ø DATA 169,Ø,133,251,169,2Ø8,133,252
                                        :REM*142
17ØØ DATA 169,Ø,133,253,169,48,133,254
                                         :REM*16
171Ø DATA 162,16,16Ø,Ø,177,251,145,253
                                        :REM*186
172Ø DATA 2ØØ,192,Ø,2Ø8,247,23Ø,252,23Ø
                                        :REM*244
173Ø DATA 254,2Ø2,2Ø8,24Ø                 :REM*4
174Ø DATA 169,55,133,1,88,96            :REM*42
175Ø REM PICK CHARACTER SET*************
                                        :REM*88
176Ø POKE2Ø4,Ø:POKE53272,21:PRINT"{SHFT CLR
     }{3 SPACEs}1) UPPER CASE"          :REM*74
177Ø PRINT"{3 SPACEs}2) LOWER CASE":REM*2ØØ
178Ø PRINT"{3 SPACEs}3) GRAPHICS CHARS"
                                        :REM*152
179Ø PRINT"{3 SPACEs}4) REV UPPER CASE"
                                        :REM*132
18ØØ PRINT"{3 SPACEs}5) REV GRAPHICS CHARS"
                                        :REM*217
181Ø PRINT"{3 SPACEs}6) REV LOWER CASE"
                                        :REM*225
182Ø PRINT"ENTER THE NUMBER OF YOUR CHOICE"
     :PRINT"('X' TO EXIT)?";            :REM*129
183Ø GETR$:IFR$=""THEN183Ø              :REM*119
184Ø IFR$="X"THENPRINT"{SHFT CLR}BYE NOW!!!
     ":END                               :REM*39
185Ø R=VAL(R$)                           :REM*83
186Ø IFR<1ORR>6THENGOTO183Ø             :REM*2Ø3
187Ø IFR=1THENRL=Ø:RH=63:GOTO193Ø        :REM*21
188Ø IFR=2THENRL=256:RH=319:GOTO193Ø:REM*37
189Ø IFR=3THENRL=64:RH=127:GOTO193Ø:REM*111
19ØØ IFR=4THENRL=128:RH=191:GOTO193Ø:REM*89
191Ø IFR=5THENRL=198:RH=255:GOTO193Ø
                                        :REM*2Ø5
192Ø IFR=6THENRL=385:RH=488:GOTO193Ø
                                        :REM*239
193Ø POKE2Ø4,1:POKE53272,29:PRINT"{SHFT CLR
     }":RETURN                          :REM*83
194Ø REM HELP***************************
                                         :REM*77
195Ø POKE53272,21                        :REM*99
196Ø PRINT"{SHFT CLR}THE FOLLOWING IS A LIS
     T OF COMMANDS THATCAN BE CALLED WHILE"
     ;                                  :REM*59
197Ø PRINT" EDITING A CHARACTER:"       :REM*149
198Ø PRINT"KEY{5 SPACEs}","FUNCTION"
                                        :REM*249
199Ø PRINT"{3 COMD Ys}{5 SPACEs}","{8 COMD
     Ys}"                               :REM*217
```

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Listing 1 continued

```
2000 PRINT"{CTRL 9}F1{CTRL 0}","COMPILE SHA
     PE"                                  :REM*181
2010 PRINT"{CTRL 9}F3{CTRL 0}","RETURN TO P
     ROMPT"                               :REM*63
2020 PRINT"{CTRL 9}F5{CTRL 0}","SAVE CHAR F
     ILE"                                 :REM*249
2030 PRINT"{CTRL 9}F6{CTRL 0}","LOAD CHAR F
     ILE"                                  :REM*9
2040 PRINT"{CTRL 9}F7{CTRL 0}","DATA FOR CH
     AR FILE"                             :REM*79
2050 PRINT" {CTRL 9}*{CTRL 0}","PUT STAR AT
      CURRENT LOCATION"                   :REM*198
2060 PRINT"' '","PUT SPACE AT CURRENT LOCAT
     ION"                                 :REM*84
2070 PRINT"{CTRL 9}CLR{CTRL 0}","CLEAR CHAR
      BOX"                                :REM*152
2080 PRINT"{CTRL 9}HOME{CTRL 0}","PLACE CUR
     SOR IN UPPER LEFT{14 SPACEs}HAND CORNE
     R"                                   :REM*32
2090 PRINT"{CTRL 9}CTRL 9{CTRL 0}","REVERSE
     S CURRENT CHAR"                      :REM*202
2100 PRINT" {CTRL 9}N{CTRL 0}","GOES TO NEX
     T CHAR"                              :REM*138
2110 PRINT" {CTRL 9}P{CTRL 0}","GOES TO PRE
     VIOUS CHAR"                          :REM*60
2120 PRINT"{CTRL 9}>>>>CURSOR KEYS MOVE CUR
     SOR<<<<{CTRL 0}"                     :REM*20
2130 PRINT"{CTRL 9}{CRSR DN}PRESS 'X' TO GE
     T BACK TO PROMPT"                    :REM*38
2140 GETQ$                                :REM*182
2150 IFQ$="X"THENPRINT"{SHFT CLR}":POKE5327
     2,29:RETURN                          :REM*124
2160 GOTO2140                             :REM*214
2170 REM ERROR CHECKING***************
                                          :REM*92
2180 IFFD=8THENGOTO2220                   :REM*180
2190 PRINT"{CRSR DN}{CTRL 9}TAPE ERROR{CTRL
      0}"                                 :REM*224
2200 FORI=1TO1000:NEXT                    :REM*78
2210 RETURN                               :REM*228
2220 PRINT"{CRSR DN}{CTRL 9}DISK ERROR{CTRL
      0}"                                 :REM*14
2230 OPEN15,8,15:INPUT#15,A1$,B1$,C1$,D1$:P
     RINTA1$;B1$;C1$;D1$:CLOSE15          :REM*10
2240 OPEN15,8,15,"I0":CLOSE15             :REM*66
2250 FORI=1TO1000:NEXT                    :REM*128
2260 RETURN                               :REM*22
```

Listing 2. *Short loader program to utilize the Data statements created in Listing 1.*

```
100 POKE52,48:POKE56,48                   :REM*134
110 POKE56334,PEEK(56334)AND254           :REM*18
120 POKE1,PEEK(1)AND251                   :REM*44
130 FORI=0TO511                           :REM*92
140 POKE12288+I,PEEK(53248+I)             :REM*66
150 NEXT                                  :REM*160
160 POKE1,PEEK(1)OR4                      :REM*160
170 POKE56334,PEEK(56334)OR1              :REM*94
180 POKE53272,(PEEK(53272)AND240)+12:REM*30
190 ADDRESS=12288+8*CHARACTER             :REM*106
200 FORX=ADDRESSTOADDRESS+7               :REM*214
210 READ DT                               :REM*88
220 POKEX,DT                              :REM*92
230 NEXT                                  :REM*240
240 DATA #'S THAT MAKE UP YOUR CHARACTER
                                          :REM*52
```

Line Number	Description
100	Sets aside memory for custom character set.
110–120	Turn off interrupts and keyboard.
130	Starts counting loop for the characters to be copied. The way it is set now, it will only copy the first 64 characters. If you want to copy more than 64 characters, multiply the number of characters you want to copy by 8 and replace 511 with that number.
140	Copies 64 ROM characters into RAM, starting at 12288 ($3000).
150	Closes loop.
160–170	Turn on keyboard and interrupts.
180	Switches in RAM character set (only 64 characters).
190	Sets ADDRESS to the start of the eight bytes containing the data for your character. Replaces CHAR with the Poke code for the character you wish to replace.
200	Starts loop for the beginning of the character you are replacing.
210	Reads in the data containing the eight bytes of information that make up your character.
220	Pokes the data into the character you are replacing (ADDRESS).
230	Closes loop.
240	This is where you put in your new character data!

Table 1. *Line-by-line description of Listing 2.*

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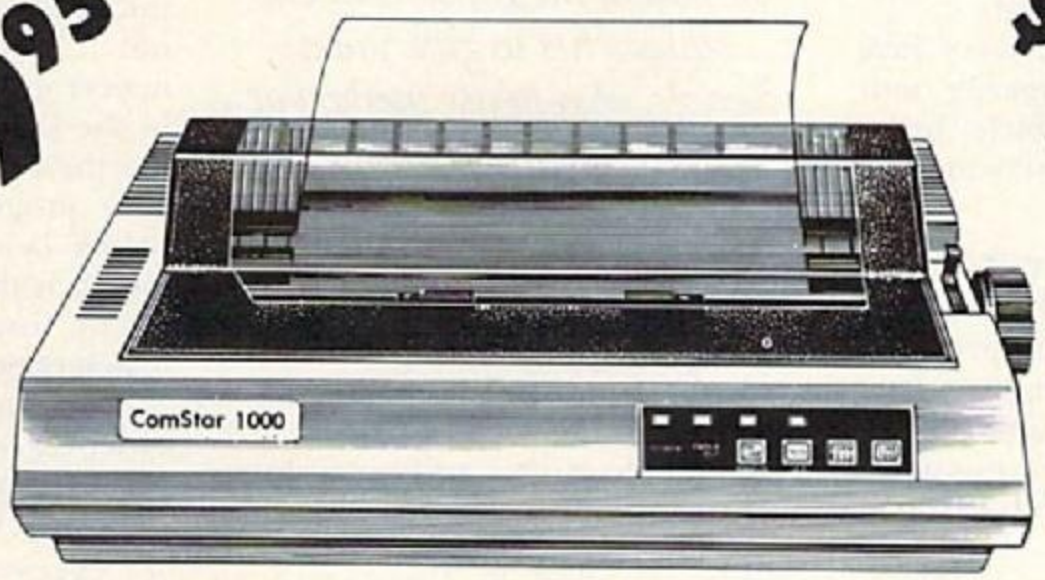

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Easy String Input

By MICHAEL BROUSSARD and JIM BORDEN

If you write Basic programs that input strings, you may use either the Input or Get statement. However, there may be cases where neither statement offers the flexibility you need.

The Input statement is very easy to use. It allows you to specify both a prompt and the variable(s) to be input. For example, the statement

```
10 INPUT "NAME";N$
```

prints the prompt, NAME? followed by a blinking cursor, and Basic waits until you type a string and press the return key. Whatever string you type will be stored in the variable N$. Although this is fine for most applications, there are some pitfalls to watch out for.

First, the string must not contain either a comma or a colon, because Basic interprets these characters as input separators. If you were to type:

```
Smith, John
```

as the input for the NAME? prompt shown above, the string "Smith" would be stored in N$, and Basic would warn you:

```
?EXTRA IGNORED
```

You can get around this problem by enclosing the string in quotation marks like this:

```
"Smith, John"
```

The quotation marks tell Basic to interpret everything inside them as a single string, even if it contains commas or colons. However, there are also disadvantages to this approach.

First, you must remember to enclose your input in quotation marks if it contains commas or colons. Second, you can't use the Input statement to input a string that contains both double quotes and separators, such as:

```
Mary said "Let's go, John."
```

The other alternative is to abandon the Input statement and use the Get statement. The Get statement inputs one character at a time from the keyboard, but leaves you with the annoying chore of building the input string yourself. The Get statement neither prints a blinking cursor nor "echoes" the characters you type on the screen, so it's virtually impossible to be sure what you're typing.

This subroutine combines the best of the Input and Get statements to give you a flexible, easy-to-use method of inputting strings.

There's an Easier Way

The rest of this article explains a machine language (ML) subroutine you can use to input strings in your programs. Like the Get statement, it allows you to input strings that contain double quotation marks and separators. Like the Input statement, it prints a blinking cursor and echoes characters so that you can see what you're typing. See Listing 1 for a sample C-64 Basic program that demonstrates the subroutine.

At first glance, the program seems rather long for an input subroutine, but it contains checking logic and many remarks to ensure that you type in the Data statements correctly. To use the subroutine, you need add to your program only the three statements below, plus the Data statements at the end of Listing 1.

The line numbers I used below match the ones in Listing 1. When incorporating the subroutine into your own programs, you may, of course, use whatever line numbers you'd like. The important statements are:

```
160 XX$="":FORX=1TO80:
    XX$=XX$+" ":NEXT:BASE=49152
165 FOR I=BASE TO BASE+42:READ
    J:POKE I,J:NEXT
1020 SYS BASE:L$=MID$(XX$,1,
    PEEK(253)):RETURN
```

Line 160 sets up an 80-character buffer, where the ML subroutine will store the input string. You may use any variable name you like (instead of XX$), but this buffer must be 80 characters long and must be the first variable Basic sees when executing your program. (Notice that all the lines prior to line 160 in Listing 1 are REM statements. This makes XX$ the first variable of the program.)

You must also make sure that no other statement in the program modifies the contents of this variable. I'll explain later why this variable must be the first one in your program and why it must not be changed.

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Line 160 also sets the variable BASE to 49152. This is the base, or starting address, of the subroutine in memory. The routine is relocatable, so you can change where it is Poked into memory by changing this value—just be careful not to Poke into an area of memory that Basic is using for something else.

Line 165 is the part of the program that actually reads the ML instructions from the Data statements and Pokes them into memory. Once the ML subroutine has been Poked in, you can use it by printing a prompt and then jumping to the short Basic subroutine at line 1020, which in turn will invoke the ML subroutine. For example:

```
30 PRINT "INPUT YOUR NAME: ";:
   GOSUB 1020
```

When you invoke the ML subroutine in line 1020 ("SYS BASE"), the routine gets characters from the keyboard buffer until you press the return key, and stores the characters in the 80-byte buffer reserved as the variable XX$ on line 160. It also Pokes a count of the number of characters read into memory location 253.

After the ML routine returns, line 1020 copies the string into the variable L$, which is then ready to be accessed by your program.

One disadvantage of the subroutine is that it always puts the input string into the same variable (in this instance, L$). This really isn't a problem, though, because you can easily move the input string somewhere else.

The following program fragment shows how you might use the subroutine to input a name and address, storing the input strings in the variables N$ and A$, respectively.

```
300 PRINT "INPUT NAME: ";:GOSUB
    1020:N$ = L$
310 PRINT "INPUT ADDRESS: ";:GOSUB
    1020:A$ = L$
```

You now know enough about the subroutine to use it effectively.

How It Works

For the curious, here is an explanation of how the ML routine actually works.

Each time the Basic interpreter encounters a new variable, it stores information about it in the symbol table. Each entry in the symbol table is seven bytes long and contains the variable's name and type.

If the variable is an integer (N%) or a real number (N), then the value is also kept in the symbol table. In the case of a string variable (N$), the actual string is not stored in the table, since symbol table entries are only seven bytes long and Basic strings can be up to 255 bytes in length. Instead, the symbol table entry contains a two-byte pointer to the place in RAM where Basic stored the string. Another byte in the table tells the string's length.

The ML subroutine works by inputting characters one at a time from the keyboard and storing them in a string variable. Unfortunately, it's not possible for ML to reference a Basic variable by name. So, to set up space for the subroutine to use as a buffer, I set aside 80 bytes of memory in the variable XX$ on line 160 of Listing 1. Since I was careful to ensure that XX$ is the first variable Basic sees when it executes the program, it will be first in the symbol table; this means that the ML routine can find it by Peeking at the first table entry.

Earlier in this article I stressed that XX$ must *never* be changed by your program after being initially set up. This is because Basic usually only allows enough room in RAM for the exact length of a string. XX$ is initialized to 80 bytes, which is long enough to contain up to two full screen lines of input.

If you subsequently change XX$ to the string "ABC", Basic will set aside only three bytes for the string; if the ML subroutine later attempts to stuff more than three characters into it, unpredictable things can happen. By not changing XX$, you'll always have 80 bytes for an input buffer.

See Listing 2 for a description of the ML code for the C-64.

String Input on the C-128

Below are two listings for the C-128. The first (Listing 3) is a Basic program that contains the data and subroutine as well as a demonstration section like the C-64 version. The C-128 version uses the cassette buffer (at $0B00 on the C-128) to store the ML subroutine. Due to the C-128's larger input buffer, 160 bytes are reserved for XX$. Different locations are used in zero-page to allow the normal free bytes at $FB–$FE, and the length is passed back to Basic by Peeking location 8. Other than that (and the bank-switching in the ML code), the C-128 version is very similar to the C-64 version.

The ML listing for the C-128 (Listing 4) shows how to read bytes from, and store bytes in, different banks. You should be in bank 15 to call any Kernal subroutine, but the strings are stored in bank 1. For this reason, two subroutines are used to transfer data between banks. By loading the X register with the *value* of the bank you want to read from or write to, you can call the Fetch or Stash subroutines in common memory (at $02A2 and $02AF, respectively). The concept of bank-switching is rather involved, but an experienced ML programmer should be able to learn the basics by studying Listing 4.

You now have another subroutine that should make string input easy on the C-64 or the C-128. We hope you enjoy the programs and find them useful. R

Address C-64 questions to Michael Broussard, 13136 Lazy Glen Court, Herndon, VA 22071; address C-128 questions to Jim Borden, 641 Adams Road, Carlisle, PA 17013.

Listing 1. *C-64 Basic program.*

```
150 REM* 64 ML STRING INPUT ROUTINE *
155 REM
160 XX$ = "":FORX = 1TO80:XX$ = XX$ +
    " ":NEXT:BASE = 49152
165 FORI = BASE TO BASE + 42:READ
    J:POKE I,J:N = N + J:NEXT
170 IF N < > 6223THENPRINT"ERROR IN
    DATA STATEMENTS!":END
180 REM
185 PRINT "INPUT A STRING:  ";
190 REM CALL THE SUBROUTINE
195 GOSUB1020:PRINT:PRINT
200 PRINT"THE STRING WAS ' "L$ " ' "
205 PRINT"THE LENGTH WAS"
    LEN(L$):END
1000 REM
1010 REM  STORE RESULT STRING IN L$
1020 SYS BASE:L$ = MID$(XX$,1,PEEK
     (253)):RETURN
5000 REM
5010 DATA 160,3,177,45,133,251,200,177,45,
     133,252,160,0,32,207,255,145,251,200
5015 DATA 201,13,208,246,136,152,170,
     201,1,208,9,160,0,177,251,201,32,208,1
5020 DATA 202,138,133,253,96
```

Listing 2. *C-64 ML code.*

```
C000 LDY #$03      ;Point past name & len.
C002 LDA ($2D),Y   ;Get pointer LO
C004 STA $FB       ;Save in indirect
C006 INY           ;Increment index
C007 LDA ($2D),Y   ;Get pointer HI
C009 STA $FC       ;Save in indirect
```

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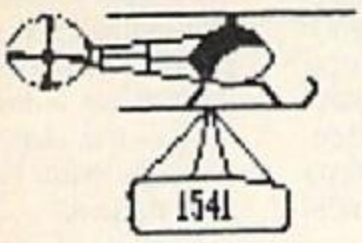

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```
C00B LDY #$00     ;Index = 0 to start
C00D JSR $FFCF    ;Call KERNAL input sub
C010 STA ($FB),Y  ;Store in XX$,y
C012 INY          ;Increment index
C013 CMP #$0D     ;A return char.?
C015 BNE $C00D    ;No = >loop
C017 DEY          ;Correct the count
C018 TYA          ;Transfer Y into A
C019 TAX          ; and then to X
C01A CMP #$01     ;Only 1 char.?
C01C BNE $C027    ;No = > okay (exit)
C01E LDY #$00     ;Yes = > index = 0
C020 LDA ($FB),Y  ;Get (XX$),0
C022 CMP #$20     ;A space?
C024 BNE $C027    ;No = >okay
C026 DEX          ;Yes = > dec index to 0
C027 TXA          ;Move count to A
C028 STA $FD      ; and store it.
C02A RTS          ;Return to Basic
```

Listing 3. *C-128 Basic program.*

```
10 REM * 128 ML STRING INPUT ROUTINE *
20 REM
30 XX$ = "":FORX = 1TO160:XX$ = XX$ +
   " ":NEXT
40 FORI = 2816 TO I + 62:READ J:POKE
   I,J:N = N + J:NEXT
50 IF N < >7610THENPRINT"ERROR IN
   DATA STATEMENTS!":END
60 REM
70 PRINT "INPUT A STRING:  ";
80 REM CALL THE SUBROUTINE
90 GOSUB1000:PRINT:PRINT
100 PRINT"THE STRING WAS ' "L$ " ' "
110 PRINT"THE LENGTH WAS"
    LEN(L$):END
980 REM
990 REM   STORE RESULT STRING IN L$
1000 SYS 2816:L$ = MID$(XX$,1,PEEK(8)):
     RETURN
1990 REM
2000 DATA 162,047,142,170,002,160,003,
     162,127,032,162,002,153,137,000,200
2016 DATA 192,005,208,243,169,140,141,
     185,002,141,170,002,160,000,140,000
2032 DATA 255,032,207,255,162,127,032,
     175,002,200,201,013,208,243,136,192
2048 DATA 001,208,011,136,162,127,032,
     162,002,201,032,240,001,200,096
```

Listing 4. *C-128 ML code.*

```
0B00 LDX #$2F     ;Indirect used in
0B02 STX $02AA    ; FETCH subroutine
                  ; {LDA ($2F)}
0B05 LDY #03      ;Point past name & len.
0B07 LDX #$7F     ;Bank 1 value for
                  ; FETCH
0B09 JSR $02A2    ;Get byte/return
                  ; to org.bank
0B0C STA $0089,Y  ;Save pointer
                  ; value (lo/hi)
0B0F INY          ;Inc index
0B10 CPY #$05     ;Read two bytes yet?
0B12 BNE $0B07    ;No = >get second
0B14 LDA #$8C     ;Put indirect into subs
0B16 STA $02B9    ;STASH sub indirect
0B19 STA $02AA    ;FETCH sub indirect
0B1C LDY #$00     ;Index = 0 to start (also
0B1E STY $FF00    ; value for Bank 15)
0B21 JSR $FFCF    ;Call KERNAL
                  ; input sub
0B24 LDX #$7F     ;Bank 1 value for
                  ; STASH
0B26 JSR $02AF    ;STASH byte in XX$,y
0B29 INY          ;Increment index
0B2A CMP #$0D     ;A return char.?
0B2C BNE $0B21    ;No = >loop
0B2E DEY          ;Correct the count
0B2F CPY #$01     ;Only 1 char.?
0B31 BNE $0B3E    ;No = okay (exit)
0B33 DEY          ;(Dec 1 = 0)
0B34 LDX #$7F     ;Bank value for
                  ; FETCH
0B36 JSR $02A2    ;Get char (XX$),0
0B39 CMP #$20     ;A space?
0B3B BEQ $0B3E    ;Yes = >count = 0/exit
0B3D INY          ;Not space =
                  ; >count = 1
0B3E RTS          ;ML done =
                  ; >back to Basic
```

end R

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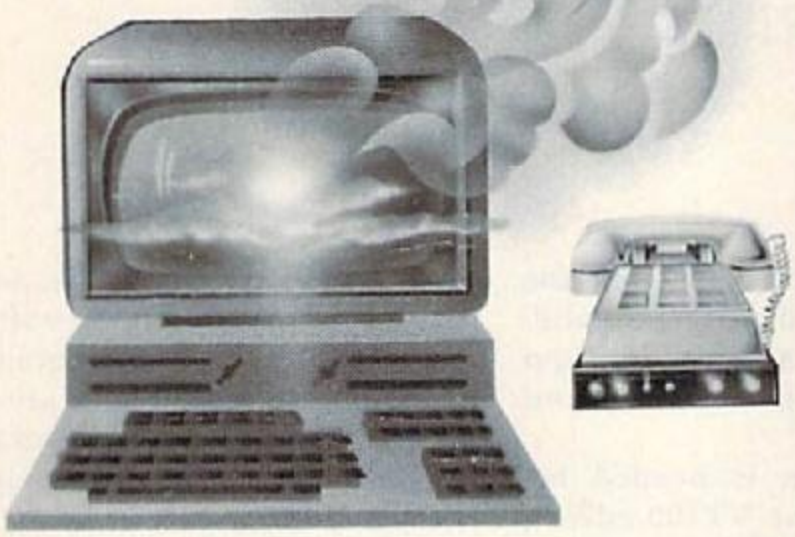

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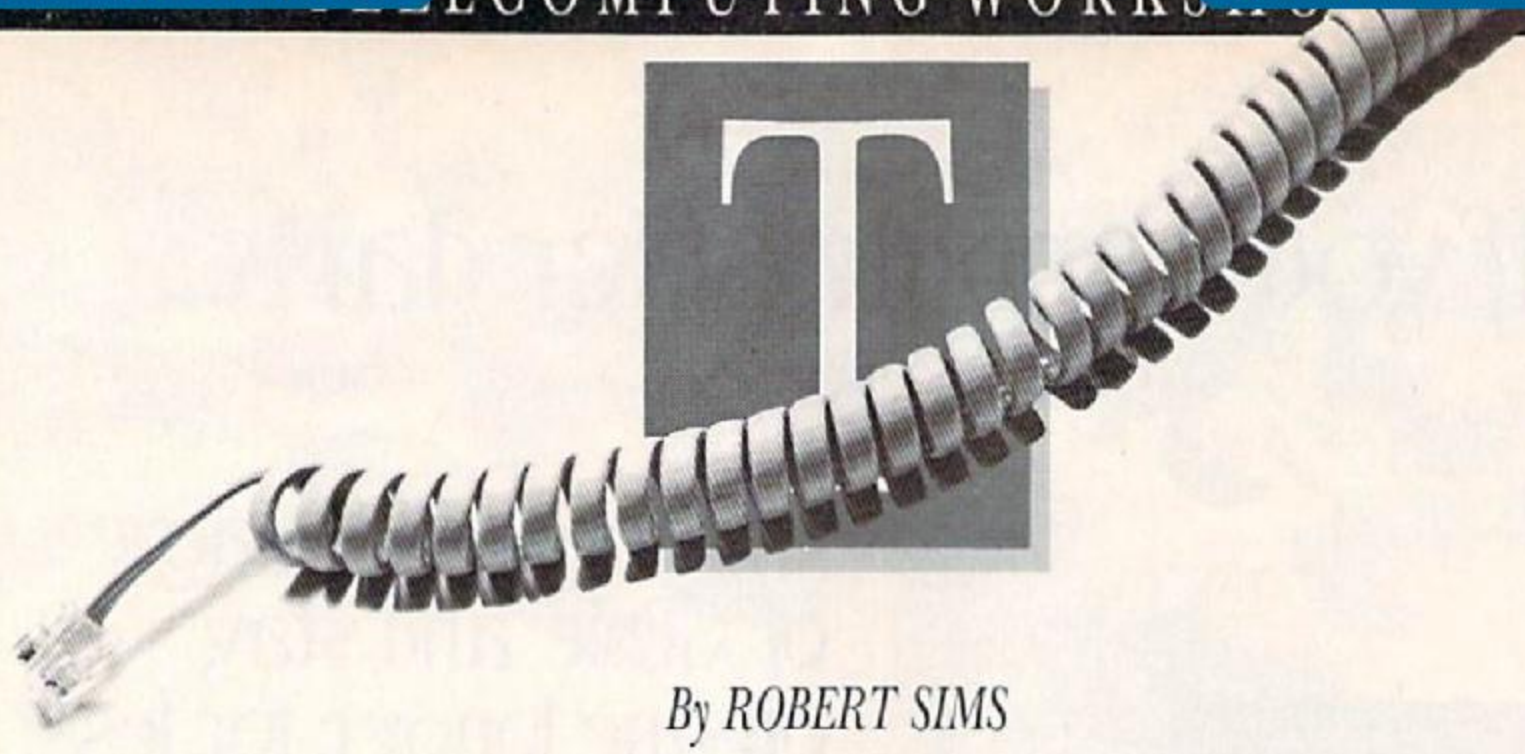

By ROBERT SIMS

Telecomputing Workshop is a monthly column directed to the needs of RUN *readers who are using, or intend to use, a Commodore computer for telecommunications. We invite you to submit your questions or comments to:*

David Bradley
Telecomputing Workshop
c/o RUN *Magazine*
80 Pine St.
Peterborough, NH 03458

In your April 1986 column, a reader asked if anyone knew of any cassette-based terminal programs. Well, the Telecomm64 and Telecomm20 terminal and data-capture programs (Metaphase Software, PO Box 7263, San Jose, CA 95150; 408-280-2978) are menu-oriented for disk or cassette. I use them with my HESmodem I.

Pete Lowas
Hot Springs, AR

In your April column, you said that if a phone has a dial, then it's a pulse system, and that if it has buttons, then it's a tone system. This isn't entirely true. Some push-button phones are pulse only; others can do either pulse or tone.

Joseph MacKenzie
Pittsford, NY

Your comments on VT100 emulation were good, but I think your readers could use more information. VT100 terminals are used with Digital Equipment Corporation (DEC) minicomputers, which are usually equipped with multiple terminals. The VT52 is the basic model; the VT100 has advanced editing capabilities; the VT120 has graphics; and there are still more sophisticated models.

VT100 emulation is needed because of the way the VT100 editing system works. Most DEC systems are equipped with an editing package called EDT, which is used for text editing and is also the environment in which programs are entered and debugged. EDT commands are entered with 15 special keys, which non-DEC terminals must simulate.

Second, EDT transmits a series of cursor commands. Without VT100 emulation, these cursor commands foul up the structure of the document and make it difficult to know if an error is present. VT100 emulation filters out the commands and executes them.

Paul Eckler
Address unknown

I am writing a bulletin board program and would like to know the codes and routines to make my modem receive and answer calls and how to save names and access numbers to disk as sequential files. Please do not refer me to a book!

Eric Brown
Baden, PA

Don't worry about being referred to a book; I don't know of any books that provide practical help in writing a BBS. There's certainly enough material for a book, though.

The best way to get the information you need is to examine the programs written by other software writers and then write your own program based on your findings. There are several public domain BBS programs around, in Basic as well as in assembly language. In addition, you can usually contact the authors on the national networks.

Many authors of the most popular BBS programs can be found on the Delphi network in the Flagship Commodore SIG (special interest group). They are usually in the conference area or in the Telecommunications database. In that database, you'll find several Basic programs that provide helpful examples. If you read the Forum messages on the topic of telecommunications, you'll be able to contact plenty of people who are working on their own BBS programs.

If you're working in assembly language, you may also want to check on QuantumLink, in the Telecommunications section of the Commodore Information Network, for more BBS source code.

I've been waiting for some time to purchase a modem for my C-64 and join the telecomputing fun. But, as far as I can tell, this won't work out for me.

Long ago I got out of the credit card trap, with its high interest, and I now pay for everything with cash or check. Apparently, all the telecomputing networks require a credit card for billing and won't open an account unless I have a card. I'm perfectly willing to pay in advance, even put

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up a deposit. Do you know of any networks open to people who pay with cash?

Douglas Slicer
Richmond, VA

If it's any comfort, you're not alone; lots of computer owners prefer cash or checks. Unfortunately, it's almost unAmerican these days not to carry plastic. Some networks do offer a checking alternative, through a service called CheckFree. You authorize the network to authorize CheckFree to authorize your bank to pay the bill automatically out of your checking account balance.

The networks' billing policies are changing. A couple of years ago, direct cash billing was possible. Today (as far as I know), there are no networks that do cash billing. CompuServe and QuantumLink both have the CheckFree alternative, and, since billing policies are subject to periodic change, other networks may offer this service. You should contact the billing office of your preferred network and ask them about the CheckFree service.

There are some modem owners who have neither credit cards nor checking accounts. While this effectively eliminates them as customers of the national networks, it doesn't mean that they are cut out of telecomputing. There are local bulletin boards and regional networks all over the continent that either are free or accept cash in advance for their services. Your local user group should have a list of the ones in your area.

Do I really need to inform the telephone company of my modem use?

Victor Borras
Bronx, NY

Yes. The law requires it, and so does your wallet.

A repairman once showed up at 7 o'clock in the morning to fix my phone, although I had no problem. It seems an operator had tried to place a call to my computer phone number; not recognizing the modem carrier signal, she reported there was a problem with my line. This misunderstanding cost me $28 for a service call.

I have a 1660 Commodore modem and an excellent smart terminal program. The program is easy to use, but it does not allow you to load and run what you've downloaded until it's converted from a sequential to a program file. My problem is that I've tried using the file-translator program listed in the manual, but can't get it to work. Any suggestions?

Stanley Patyrak
Slidell, LA

I'd first check to make sure you typed in the translator program correctly. If you did, and it still doesn't work, you'll find a utility program that converts sequential files to program files in the June 1986 issue of *RUN* ("Easy Disk-File Conversion," p. 78). R

Q-Link Happenings

This is the first in a series of columns for current and would-be subscribers to QuantumLink, the telecommunications service for C-64/128 users. Each month, we'll examine Q-Link's latest features and improved services.

The introduction of Lucasfilm's new on-line interactive game, tentatively called Habitat, has generated much excitement among Q-Link users. To find out how you can soon become a player in this unique world simulation, be sure to read the review on p. 24.

Q-Link subscribers can now make airline, hotel and car-rental reservations directly by accessing EAASY SABRE, the American Airlines personal reservations service. You can choose from over 650 airlines, 12,000 hotels and 20 car-rental companies worldwide, as well as check the weather report for the area you'll be visiting. The exclusive "Bargain Finder" feature assures you of getting the lowest possible air fare.

Q-Link has also expanded its news and information department by adding the Reuters NewsView Service. Updated every ten minutes, Reuters provides the latest news on national, international, weather and business developments.

The Resource Center, *RUN*'s popular education column, is now available on-line. Q-Link subscribers can view curriculum guides, teaching strategies, eduational applications and software reviews and can download programs.

Did you know that Q-Link software, which lets you access QuantumLink via modem, is now being bundled with each new 64C computer? Now, new owners can immediately experience the world of QuantumLink. R

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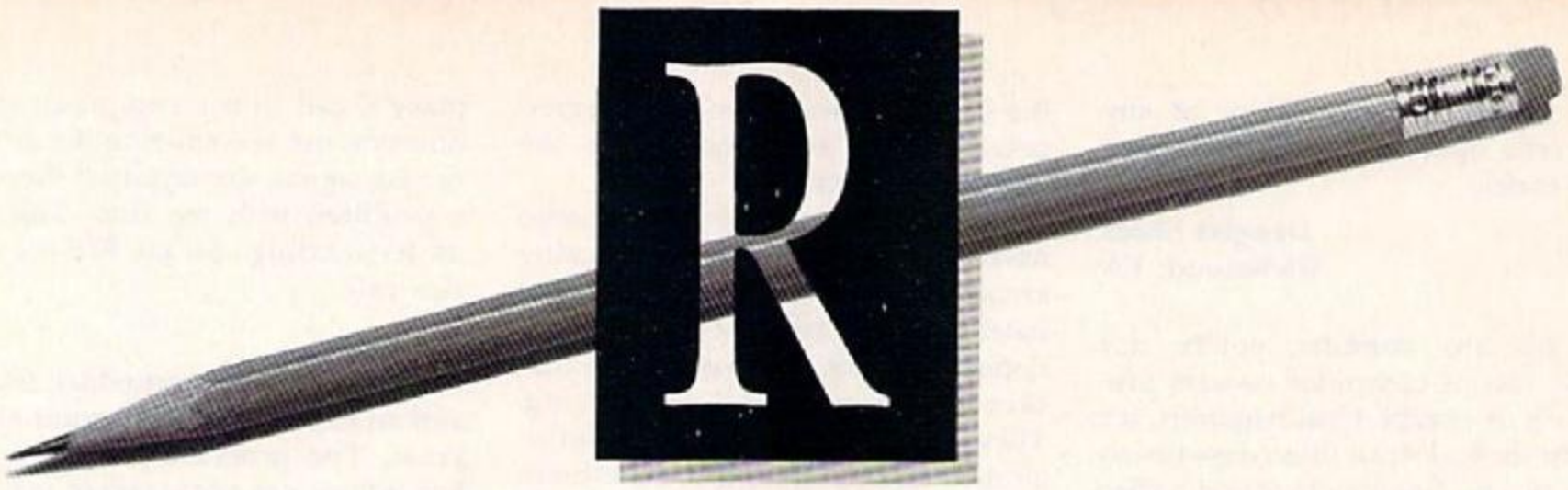

By MARGARET MORABITO

Telecommunications is quickly becoming a tool for education, especially as the price of computers and modems falls. A myriad of on-line opportunities are now in the works, serving teachers, administrators and students. As national and state networks, as well as local BBSs, get involved with education, the possibilities for communicating and studying with others are extending beyond the boundaries of a single school, community or even state.

This month, we'll explore some of this on-line activity at the local level and discuss the potential for telecommunications in education.

This month's column discusses how teachers are using telecommunications in education.

Telecommunicating Teachers

Earlier this year, Ken Blystone, a 15-year veteran teacher of English and computer literacy in El Paso, Texas, contacted me about his on-line educational activities using Commodore equipment.

Blystone has been involved with telecommunications for about a year-and-a-half now. Last year he was prompted to explore the communicative aspects of telecommunications when the state of Texas mandated that computer literacy be taught in all 7th and 8th grades. At the time, many teachers wondered if they would be asked to teach the courses and, if so, how they would approach the task.

Blystone explored various possibilities for getting teachers in touch with computer experts so that they could ask questions, get advice and start learning about computers. One solution was to get the teachers on-line.

Texas was already involved with providing on-line opportunities for statewide education organizations with its connections on The Electric Pages network, in Austin. The Electric Pages holds public and private networks for a variety of educational agencies, as well as the Texas Computer Education Association. These networks give members a chance to exchange ideas with others in their areas of expertise, to post messages and to read the latest policy decisions from the state and national level. It was a good place to learn how educators could benefit from on-line activities.

Blystone decided to implement this concept on a local level by starting up a SIG (special interest group) on an existing BBS (KiloNet) in El Paso. The new group was named Edu-SIG, and its goal was to promote communication among teachers and to share curricular ideas. In addition, the teachers could gain access to computerists in other SIGs who were regular users of KiloNet, to ask them questions and to get advice about computers.

The choice to use a local BBS rather than a national or state network was a monetary one. To join the SIG, the teachers wouldn't have to pay the subscription fees, hourly connect fees or long-distance phone bills that an outside network would cost them.

One problem encountered with Edu-SIG was that the KiloNet board was very popular and had about ten other SIGs on it. It attracted several hundred users, and, because it was a single line BBS (only one caller at a time), the teachers in Edu-SIG frequently couldn't gain access. This problem finally led Blystone to stop Edu-SIG and start a separate BBS devoted solely to education.

Electric Chalkboard

Blystone began his new BBS, the Electric Chalkboard, last April. The new service has a different focus from his previous SIG. Aimed at instructional activities for students, the board currently provides after-school enrichment courses for young people in the El Paso area.

Blystone is excited about the instructional potential for this type of educational BBS. He has contacted teachers with computers to teach on the BBS. The teachers create their own lessons in the form of articles and tests. Subjects currently scheduled include astronomy, computer history, vocabulary development and reading.

The board is designed so that students can log on and access the teacher-prepared lessons. The lessons can be read on-line and can be downloaded for study afterwards. When the student feels comfortable with the material, she or he can take a test on-line.

Students can request test answers from the board's SYSOP (Blystone) and score the test themselves. There is the option for direct student-teacher communication, with students using a private message feature to leave questions about certain subjects for the specific teachers.

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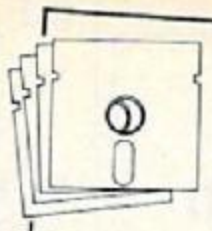

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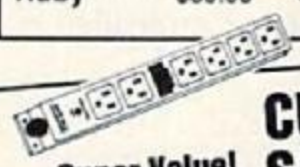

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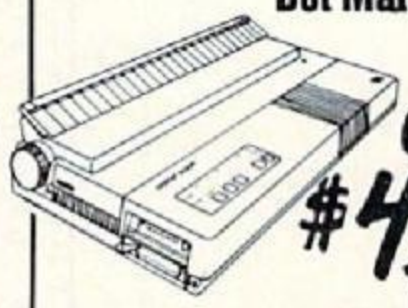

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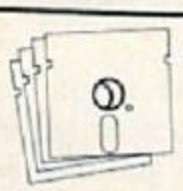

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The BBS is open to everyone, but most students on the Electric Chalkboard range in age from 11 to 17. Users are from various schools throughout the district, creating a diversified user base.

Possible Applications

The Electric Chalkboard has a lot of potential for implementation by schools, as well as by other teachers working out of their homes. Schools could set up their own BBSs and tailor the materials to their particular curriculum. Teachers could then post lessons, assignments and quizzes that were directly tied in with their classes, and they could offer enrichment courses.

The benefits to students are varied. For example, a student who is homebound with an illness could keep on schedule by being able to access assignments, submit homework by uploading it on-line and even take tests. Interaction with the student's own teachers could be maintained on a daily basis through the BBS.

If several schools in a district had their own BBSs, computer literacy classes could well use these as opportunities to learn about telecommunications. Students could practice skills such as logging on, capturing textfiles into a computer's buffer, downloading, uploading, leaving and sending mail and even real-time chatting. This would be free practice.

Furthermore, there is the possibility of using the BBS as an after-school tutoring center for basic skills. Blystone's school, Desert View, already has an after-school tutoring program. This concept could be applied to a community or school BBS without the restrictions of time schedules or physical presence.

The BBSs could also be used as a point of contact to talk with teachers for any purpose: academic problems, counseling, job referrals and bibliographic information, to name a few.

Cost and Equipment

Setting up the Electric Chalkboard with Commodore equipment made the project quite affordable for Blystone. He uses a C-64 and two 1571 disk drives to run the board (1541s can also be used). He also uses a 1525 dot-matrix printer, a 300-baud Westridge modem and a television set as a monitor. The BBS uses the Telemessage Software from Tailored Solutions ($79.50).

Blystone is very enthusiastic about the Commodore line of computers. His setup cost him only $600, which he estimates would be about the average cost for anyone just starting out. Blystone has a C-128 that he'll be using for the board when Tailored Solutions comes out with the C-128 version of their software.

Some Thoughts

On-line education is still new, and there are problems that have yet to be discovered and ironed out. Teacher training is a big concern. If telecommunications is to succeed in the community and in schools, teachers must learn how to handle their own on-line activity. Teacher training sessions will have to be offered so that the learning is shared and encouraged.

There is also the cost involved for the BBS hardware and software. A single BBS, like Blystone's, is quite affordable and might be all that is needed for a single school. For a large school district where each school will be using their own BBS, the costs would be multiplied.

Also, schools have to pay to have more telephone lines installed. At a minimum, a school should have one line installed that will be used strictly for the BBS and then at least one other line devoted to a computer with modem that could be used for telecommunications activities. This minimal setup wouldn't be very expensive, but the cost of providing an entire computer lab with modems could get steep.

In addition, students and teachers have to buy modems for their home computer systems. In Blystone's case, this is the biggest roadblock right now. While many of the students and teachers have computers, they do not yet have modems; however, prices of modems for Commodore computers continue to fall and are now available for well under $50.

Although there are problems to consider, we must also consider that computer use and telecommunications will be a part of our students'

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futures. This is certainly an area that will be getting more attention.

If you would like more information about the Electric Chalkboard BBS, contact Ken Blystone at 3012 Killarney, El Paso, TX 79925. For information about the Telemessage Software, contact Tailored Solutions, PO Box 183, Washington, DC 20044. Also, if you would like information about the Electric Pages Network in Austin, write to PO Box 2550, Austin, TX 78768.

News

Speaking of telecommunications, the Resource Center on QuantumLink is in action. Also, there are two new education features on Q-Link: a tutoring center and on-line courses. If you would like to teach in these new areas, contact me in the Resource Center—either by mail or on-line.

Also, if you are already running an education BBS, please contact me. I am compiling a list of these BBSs and would like to find out how they are being used.

I was recently contacted by a representative from Newton's Apple television show. Many schools use this PBS science series as a classroom tool. The underwriters of the show offer curriculum materials to schools as a supplement to the television shows, and they are now offering a free disk of educational programs directly related to these shows. This freeware disk will be available to any local educational BBS. Contact me if you're interested in getting this.

Lastly, the Young Astronaut Council has announced the creation of the Young Astronaut Continuing Education Foundation. Its main focus will be to provide $1000 awards to young people who graduate from a college or university with a bachelor's degree in math or science.

In order to be eligible now, a child under the age of ten must be nominated by an individual who donates $27.50 to the foundation. The first awards will be given in 1997. Contact the Young Astronaut Council, PO Box 64532, Washington, DC 20036 or call 202-682-1986 for more details. R

If you are using Commodore computers for educational purposes (at home or at school) and would like to share your experiences through The Resource Center, write me a letter detailing the equipment you're using, the subject areas involved, the age or grade level of your students, software you have found effective and any other information you feel like including. Send letters to:

Margaret Morabito
The Resource Center
c/o RUN *Editorial*
80 Pine St.
Peterborough, NH 03458

You can also leave messages in my on-line mail boxes: CompuServe (70616,714), Delphi (MARG M) and QuantumLink (MARG M). The Resource Center now has its own on-line SIG in The Learning Center on QuantumLink.

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From p. 10.

party disk drive, you can return to a single-sided mode with this command:

```
OPEN 15,8,15:PRINT# 15, "U0>M1":CLOSE15
```

Trent Bills
Lincoln, NE

$31A C-128 screen saver—The C-128's Binary Save command can be used as a nearly "invisible" screen save:

```
BSAVE"SCREEN",P1024 TO P2024
```

It will save text or graphics characters currently on the screen.

To preserve their color values, make a second binary file:

```
BSAVE"COLOR",P55296 TO P56296
```

You will lose some screen area to your BSave commands and the computer's replies, but you can reduce the screen loss with the following command:

```
WINDOW 0,24,39,24
```

This keeps your commands and the computer's replies to a single line, and it won't disrupt the image you're trying to save.

You can also use the screen save to merge programs. If you list single pages of your current program and save them in binary files, you can recall them after you've loaded a new program. Then, you simply exit the Window mode, bring the cursor to the top of the screen and press the return key on every line you wish to add to the current program. (Make sure your new program doesn't duplicate any lines from your old program, or they'll be overwritten.

Scott Hanson
San Diego, CA

$31B C-128 spiralgraph—Here's a three-line update to Matt Woodring's "C-128 boxed spirals" (see trick $2C1, *RUN*, March 1986). It changes most of the variables to let the 128 really do its thing.

```
1 COLOR 0,1:COLOR 4,1
5 A=11:X1=0:Y1=0:X2=160:Y2=195
10 GRAPHIC 3,1:FOR J=0 TO 360 STEP A:BOX
   3,X1,Y1,X2,Y2,J,0:NEXT
20 A=A-.5:X1=X1+5:Y1=Y1+5:X2=X2-5:Y2=Y2-5:GOTO 10
```

James D. Hanke
Yakima, WA

$31C C-64 screen position—My short machine language subroutine keeps track of the current screen position when I need to display a message in another area of the screen.

For example, after accessing disk files, I include a routine in my program to display disk-status messages in the upper-left corner of the screen. The routine then returns the cursor to its previous screen location. Type SYS 49152 to save the current screen location and SYS 49157 to return the cursor to the previous screen location.

```
1Ø FOR L = 1 TO 1Ø:READ PC(L):NEXT
2Ø L=1 : FORLOC= 49152 TO 49161
3Ø POKE LOC,PC(L):L=L+1:NEXT
4Ø DATA 56,32,24Ø,255,96,24,32,24Ø,255,96
9Ø OPEN15,8,15:INPUT#15,E,E$:GOSUB5ØØ
5ØØ SYS49152:REM SAVE CURRENT SCREEN LOCATI
    ON
5Ø5 PRINT"{HOME} {CTRL 2}DISK STATUS:{COMD
    7} ";E$:REM MESSAGE
51Ø FORSL=1TO5ØØ:NEXT:REM DELAY
515 SYS49157:REM PREVIOUS LOCATION
52Ø RETURN
```

Stanley C. Evans
Bahama, NC

$31D C-64 Basic to C-128 Basic conversion—This C-128 Basic program will read a sequential disk file and enter it as a program, using the dynamic keyboard technique. Make sure you're in C-64 mode, and then load the C-64 program to be converted to C-128 Basic. Type in the following lines to create the list file of the C-64 program and press the return key.

```
OPEN 2,8,2,"FILENAME,S,W": CMD 2: LIST
CLOSE 2
```

Now run the following program in C-128 mode.

The program will work in both 40- and 80-column modes, but use the 80-column mode to see the action. The program also works well with programs downloaded in text form via modem.

```
1 REM C64 TO C128
63997 DCLEAR: OPEN 2,8,2,"Ø:FILENAME"
63998 FAST: DO: C$="": L$="": DO: GET# 2,C$
      : IF ST>64 THEN SLOW: CLOSE 2: PRINT
      "DONE!": END: ELSE: L$=L$+C$: LOOP UN
      TIL C$=CHR$(13): LOOP UNTIL VAL(L$)
63999 PRINT CHR$(147)+CHR$(17)+CHR$(17)+L$;
      : PRINT "GOTO 63998"+CHR$(19);: POKE
      842,13: POKE 843,13: POKE 2Ø8,2
```

Mike Tranchemontagne
Nashua, NH

$31E GET on the C-128—Many of you prefer using the Get routine over the Input routine because Get allows you to stop program execution with the stop key, while Input requires a run/stop-restore combination to break out, thus causing you to lose your screen.

Well, the C-128 has an undocumented fix for this that allows you to break in on the Input prompt. Simply hold down the run/stop key and press the enter key on the keypad. *Voila!* You'll see the familiar Break In Line Xxxx message, with the screen intact.

J. Ian Stott
Hamilton, Ontario
Canada

$31F Commodore 128 Muzak—Try this trick with your C-128 and disk drive. Insert into the drive the tutorial disk that came with your computer. Then type in these lines in Immediate mode:

```
BLOAD"128MUSIC",B0,P32768
BANK0:SYS 32771,1,1
```


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AHOY July 85

"I found Vizastar would do anything Lotus 1-2-3 could, and then some. It's my Commodore choice to become the standard against which the others will be judged."

INFO 64 Magazine, Issue #7

"Vizastar is an exceptional package that rivals the features of programs such as Lotus 1-2-3 and offers C64 owners the kind of integrated software previously only available for higher-priced systems."

RUN Magazine, June 1985

"I scrutinized, tested and experimented with Vizastar extensively, but could find no weaknesses whatsoever. It is the most comprehensive, most flexible, most powerful and easiest to use integrated software package I've worked with."

Commodore Microcomputer, Sept-Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in someways better than 1-2-3."

Steven Roberson, NC. End User

"I have used Multiplan and Superbase; both are good pieces of software, but are inadequate when compared to Vizastar."

Jim Mathews, WA. End User

"So good, I bought a second C64 and Vizastar for my office. A wild bargain! You've saved me from having to buy IBM and Lotus."

Philip Ressler, MA. End User

VIZAWRITE CLASSIC for C128

This is the new word processor from Vizastar's author, Kelvin Lacy and is the successor to Omniwriter, which he also wrote. All the features of Omniwriter are there, plus many significant enhancements, like auto pagination, on-line help, pull-down menus, full-function calculator and more. Up to 8 'newspaper-style' variable-width columns can help with newsletters.

Three different proportionally-spaced "near letter quality" fonts are also built-in for use with Commodore or Epson compatible printers. You can merge almost any other word processor file directly into Vizawrite, including Paper Clip and Omniwriter. Naturally, it is also compatible with Vizastar. At all times, what you see on the screen is exactly the way it will be printed out. Vizawrite can do mail-merges and has an integrated 30,000 word spelling checker that you can expand yourself.

PROGRAM SPECIFICATIONS

Both Vizawrite and Vizastar are written in 100% machine language and run in the 128's FAST mode, making it lightning fast. They require a C128 with 80 column color or monochrome monitor. Both come with a cartridge, a diskette, and a reference manual. Vizastar also includes a 50 page tutorial book. Both work with 1541 or 1571 disk drives.

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Vizastar 128 is priced at **$119.97.** Vizawrite's price is **$89.97.** Vizastar 64 XL8 is now available for **$119.97.** We are so positive you will be satisfied with our programs that we offer a 15-day money-back guarantee. Try it Risk-Free. Call us today or send a check or money order. VISA/MC accepted.

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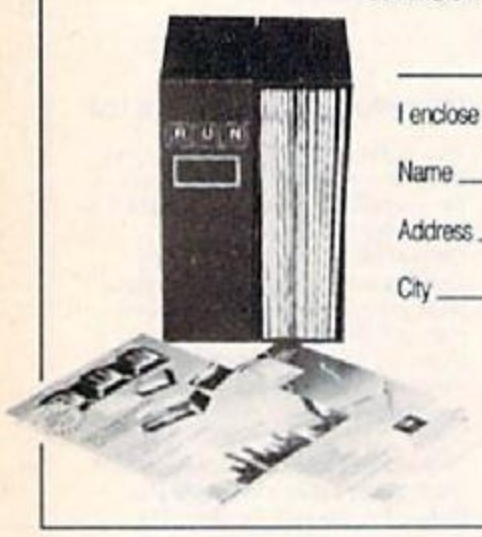

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The music you hear is on the demo program. When it ends, type:

```
SYS 32771,2,1
```

And, when *that* finishes playing, type:

```
SYS 32771,0,1
```

Now change the 1s to 0s. To stop the music, type:

```
SYS 32774
```

Jeremy Winnick
Cloverdale, IN

$320 Artistic Commodore—Here's a 74-byte machine language title-enhancement routine for the C-64. Whenever you enter SYS 49152, all the graphics and text will be bathed in color. Press the space bar or joystick fire-button to terminate the routine. It makes a nice introduction to your programs!

```
Ø REM C-64 TITLE ENHANCEMENT
1 DATA 169,254,45,14,22Ø,141,14,22Ø,169
2 DATA 16,44,Ø,22Ø,24Ø,4Ø,44,1,22Ø,24Ø
3 DATA 35,169,14,141,25Ø,3,169,24,141
4 DATA 251,3,173,25Ø,3,141,32,2Ø8,141
5 DATA 33,2Ø8,2Ø6,251,3,2Ø8,251,2Ø6,25Ø
6 DATA 3,2Ø1,255,24Ø,213,169,Ø,24Ø,226
7 DATA 162,15,142,32,2Ø8,162,14,142,33
8 DATA 2Ø8,169,1,13,14,22Ø,141,14,22Ø
9 DATA 96
1Ø FORX=ØTO73:READA:POKE49152+X,A:NEXT
11 PRINTCHR$(147)SPC(16Ø)CHR$(144)
12 PRINTSPC(8)"{CTRL 9}{22 SPACEs}"
13 PRINTSPC(8)"{CTRL 9}{4 SPACEs}*{4 SPACEs
   }MAGIC{4 SPACEs}*{3 SPACEs}"
14 PRINTSPC(8)"{CTRL 9}{22 SPACEs}"
15 PRINTSPC(8)"{CTRL 9}{3 SPACEs}*{4 SPACEs
   }IS FUN{5 SPACEs}*{2 SPACEs}"
16 PRINTSPC(8)"{CTRL 9}{22 SPACEs}"
17 PRINTSPC(222);SPC(222)"PRESS {CTRL 9} SP
   ACE {CTRL Ø} OR {CTRL 9} FIRE-BUTTON ":S
   YS49152
```

James Pellechi
Middle Island, NY

$321 C-64 Digit Fidget—The Number Formatting program in *RUN*'s May 1986 issue ("Basically Speaking") can be accomplished more simply. Line 30 multiplies the integer (INT) of INPUT, C (+.006 for rounding purposes), by 100 and divides the result by 100, to return the decimal to the correct place. Placing the dollar sign to the left of the output is no problem with this handy magic trick.

```
1 REM C-64 DIGIT FIDGET
1Ø PRINT"{SHFT CLR}"
2Ø INPUT"AN EXAMPLE OF COST $";C:C=C+.ØØ6
3Ø K=((INT(C*1ØØ))/1ØØ)
4Ø PRINT"THE COST WAS: ";K
5Ø PRINT"{14 SPACEs}{CRSR UP}$":END
```

G. Majewski
Chicago, IL

Compiled by *RUN* staff members
Harold Bjornsen, Margaret Morabito and Tim Walsh

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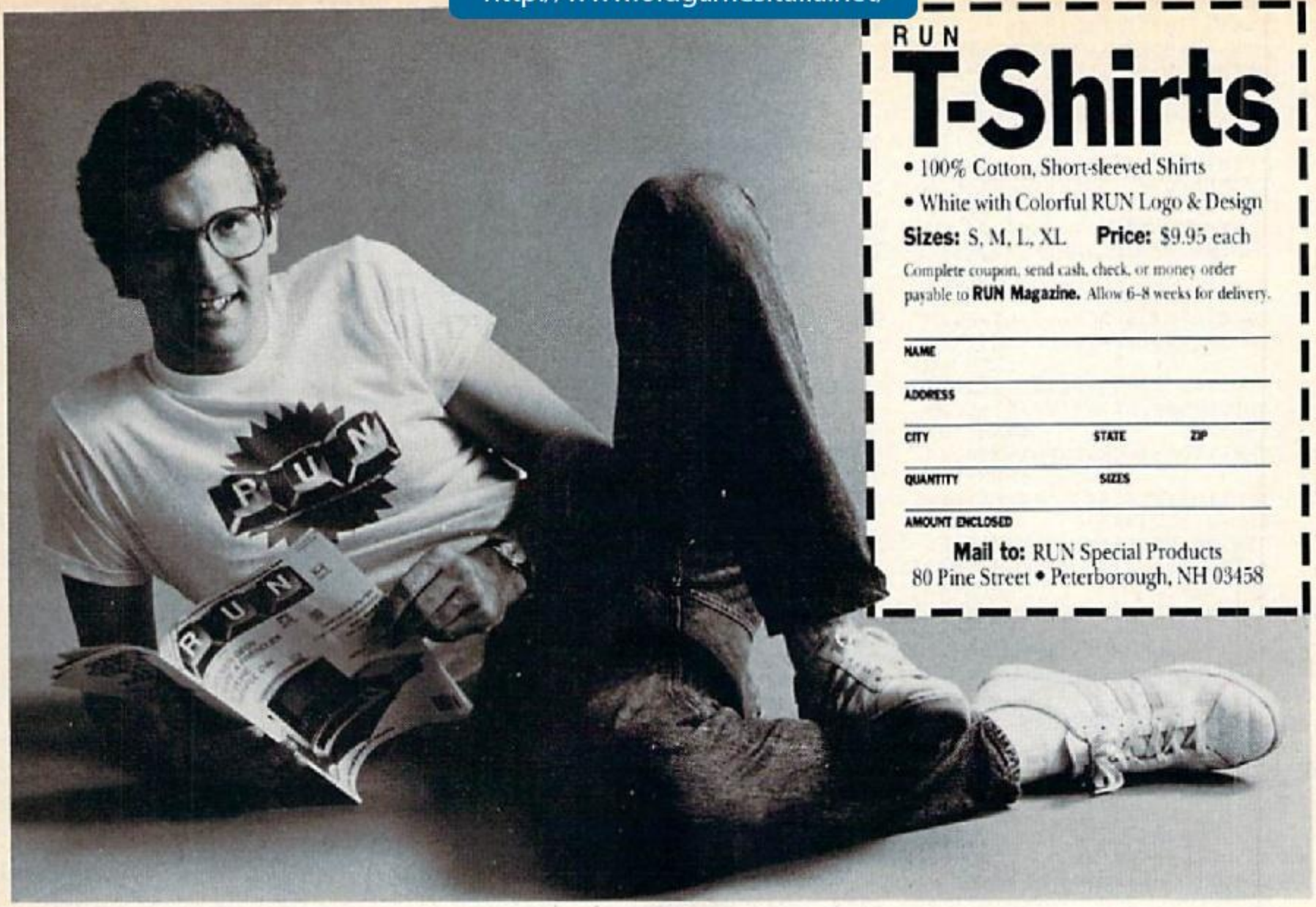

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Listing 1 continued. *From p. 40.*

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```
1TO9:X$=X$+A$:NEXT :REM*104
313Ø Y$=B$+"{8 SPACEs}":Z$="{8 S
     PACEs}"+B$:WW=54:D$(NF+1)=M
     ID$(BL$,1,25):LM=22:REM*218
314Ø D$(NF+2)=D$(NF+1):IFGTHENLM
     =LM-4:G=G+EL:WW=WW+2*LEN(E$
     (G))                :REM*176
315Ø IFLEN(L$)<WW-2*LEN(E$(G))-2
     9THENL$=L$+"{SHFT SPACE}":G
     OTO3315Ø            :REM*22
316Ø F$=N$:SYS5ØØ46:GOSUB35ØØ:GO
     SUB36ØØ:IFGTHENPRINT#4,Y$;
                         :REM*72
317Ø L$=B$+E$(G)+"{2 SPACEs}"+F$
     +E$(G)+"{4 SPACEs}"+L$+B$:P
     RINT#4,L$;:IFGTHENPRINT#4,Z
     $;                  :REM*78
318Ø PRINT#4:GOSUB36ØØ:GOSUB35ØØ
     :GOSUB36ØØ:J=INT(NF/2):IFJ=
     ØTHENJ=1            :REM*192
319Ø FORM=1TOJ:IFGTHENPRINT#4,Y$
     ;                   :REM*164
32ØØ F$=D$(M):SYS5ØØ46:H$=F$:F$=
     D$(M+J):SYS5ØØ46    :REM*58
321Ø PRINT#4,B$;E$(G);H$"{2 SPAC
     Es}"F$;E$(G);B$;:IFGTHENPRI
     NT#4,Z$;            :REM*48
322Ø PRINT#4:IFM<>17ORG=ØTHEN324
     Ø                   :REM*242
323Ø IFM<>JTHENGOSUB36ØØ:GOSUB35
     ØØ:Y$=BB$:Z$=Y$:GOSUB36ØØ:F
     F=Ø                 :REM*2
324Ø NEXTM:GOSUB38ØØ:FORM=MTOLM:
     GOSUB36ØØ:NEXT      :REM*82
325Ø IFFFTHENGOSUB35ØØ:IFG=ØTHEN
     329Ø                :REM*164
326Ø IFG=ØTHEN329Ø       :REM*74
327Ø G=Ø:FORM=MTOLM+27:PRINT#4,B
     B$;:GOSUB36ØØ:NEXT :REM*2Ø2
328Ø PRINT#4,BB$;:GOSUB35ØØ
                         :REM*114
329Ø PRINT#4:CLOSE4:GOTO23Ø
                         :REM*1Ø
35ØØ IFGTHENPRINT#4,X$;  :REM*95
351Ø FORK=1TOWW:PRINT#4,A$;:NEXT
     :IFGTHENPRINT#4,X$; :REM*31
352Ø PRINT#4:RETURN      :REM*71
36ØØ IFGTHENPRINT#4,Y$; :REM*198
361Ø PRINT#4,B$;:PRINT#4,MID$(BL
     $,1,WW-2);:PRINT#4,B$;:IFGT
     HENPRINT#4,Z$;      :REM*25Ø
362Ø PRINT#4:RETURN      :REM*172
38ØØ GOSUB36ØØ:IFGTHENPRINT#4,Y$
     ;                   :REM*52
381Ø X=(WW-17)/2:PRINT#4,B$MID$(
     BL$,1,X)MID$(BL$,1,4-LEN(ST
     R$(BF)));           :REM*23Ø
382Ø PRINT#4,BF"BLOCKS FREE"MID$
     (BL$,1,WW-X-17);B$;:IFGTHEN
     PRINT#4,Z$;         :REM*22
383Ø PRINT#4:M=M+2:RETURN:REM*18
5ØØØ GOSUB91ØØ:PRINTTAB(11)"{CRS
     R DN}SEND DISK COMMAND"
                         :REM*211
5Ø1Ø PRINT"{2 CRSR DNs}{3 SPACEs
     }TYPE DISK COMMAND AND PRES
     S RETURN"           :REM*11
5Ø2Ø R=1Ø:C=2:W=36:GOSUB8ØØØ:IFS
     $=""THEN23Ø         :REM*175
5Ø3Ø GOSUB95ØØ:PRINT#15,S$:GOSUB
     96ØØ                :REM*99
5Ø4Ø IFER>19THENCLOSE15:GOTO23Ø
                         :REM*227
5Ø5Ø PRINT:PRINTTAB(19)"{2 CRSR
     DNs}{CTRL 9}OK":X$=MID$(S$,
     1,1)                :REM*39
5Ø6Ø IFX$="V"ORX$="S"ORX$="R"ORX
     $="N"ORX$="C"THENNN$=""
                         :REM*97
5Ø7Ø CLOSE15:GOSUB98ØØ:GOTO23Ø
                         :REM*117
55ØØ GOSUB91ØØ:PRINTTAB(12)"{CRS
     R DN}FORMAT NEW DISK"
                         :REM*27
551Ø PRINTTAB(8)"{2 CRSR DNs}ENT
     ER NAME FOR NEW DISK":
552Ø R=1Ø:C=11:W=16:GOSUB8ØØØ:IF
     S$=""THEN23Ø        :REM*167
553Ø SN$=S$:PRINT"{CRSR DN}{3 SP
     ACEs}ENTER UNIQUE TWO CHARA
     CTER DISK ID"       :REM*39
554Ø R=14:C=18:W=2:GOSUB8ØØØ:IFS
     $=""THEN23Ø         :REM*127
555Ø IFLEN(S$)<>2THENPRINT"{5 CR
     SR UPs}":GOTO553Ø   :REM*33
556Ø SD$=S$:PRINTTAB(5)"{CRSR DN
     }{CTRL 9}WARNING!{2 SPACEs}
     FORMATTING WILL ERASE"
                         :REM*237
557Ø PRINTTAB(5)"{CTRL 9}ANY EXI
     STING FILES ON THE DISK!"
                         :REM*137
558Ø PRINTTAB(8)"{CRSR DN}PROCEE
     D WITH FORMAT?":R=19:C=3Ø:W
     =1:GOSUB8ØØØ        :REM*45
559Ø IFS$<>"Y"THEN23Ø    :REM*241
56ØØ GOSUB97ØØ:PRINTTAB(9)"{CRSR
      DN}{CTRL 9}FORMATTING IN P
     ROGRESS"            :REM*145
561Ø CLOSE15:OPEN15,8,15:PRINT#1
     5,"NEWØ:"SN$","SD$:CLOSE15:
     NN$="":GOTO23Ø      :REM*63
5999 REM READ DISK DIRECTORY INT
     O D$                :REM*198
6ØØØ GOSUB95ØØ:IFERTHEN23Ø
                         :REM*63
6Ø1Ø GOSUB82ØØ:T=18:S=1:IFN$=NN$
     ANDFP=ØTHENCLOSE3:RETURN
                         :REM*223
6Ø2Ø NN$=N$:IFFP=ØTHENNF=Ø
                         :REM*35
6Ø3Ø PRINT#15,"B-P:3,4":BF=Ø:FOR
     K=1TO35:GET#3,X$    :REM*5
6Ø4Ø IFX$<>""ANDK<>18THENBF=BF+A
     SC(X$)              :REM*181
6Ø5Ø GET#3,X$:GET#3,X$:GET#3,X$:
     NEXT                :REM*197
6Ø6Ø TT=T:SS=S:PRINT#15,"B-R:3,Ø
     ";T;S:PRINT#15,"B-P:3,Ø"
                         :REM*237
6Ø7Ø GET#3,T$:T=Ø:IFT$<>""THENT=
     ASC(T$)             :REM*43
6Ø8Ø GET#3,S$:S=Ø:IFS$<>""THENS=
     ASC(S$)             :REM*141
6Ø9Ø FORK=ØTO7:PRINT#15,"B-P:3";
     K*32+2:GET#3,X$:IFX$=""THEN
     621Ø                :REM*233
61ØØ W=ASC(X$):Y$=TP$(WAND7):IF(
     WAND128)<>128THENY$="*"+MID
     $(Y$,2)             :REM*97
611Ø IF(WAND64)=64THENY$=Y$+"<":
     GOTO613Ø            :REM*43
612Ø Y$=Y$+" "           :REM*41
613Ø PRINT#15,"B-P:3";K*32+3Ø:GE
     T#3,X$:B=ASC(X$):GET#3,X$
                         :REM*1
614Ø IFX$<>""THENB=B+256*ASC(X$)
                         :REM*45
615Ø C$=MID$(STR$(B),2):IFLEN(C$
     )<3THENC$=MID$("{4 SPACEs}"
     ,1,3-LEN(C$))+C$    :REM*248
616Ø PRINT#15,"B-P:3";K*32+5:SYS
     5ØØØØ:IFF$<>FF$ORFP=ØTHEN62
     ØØ                  :REM*154
617Ø PRINT#15,"B-P:3";K*32+2:EX=
     Ø                   :REM*1ØØ
618Ø X=WOR64:IFFP=2THENX=WAND191
                         :REM*64
619Ø PRINT#3,CHR$(X);:PRINT#15,"
     B-P:3,Ø":PRINT#15,"U2:3,Ø";
     TT;SS:RETURN        :REM*18Ø
62ØØ IFFP=ØTHENNF=NF+1:D$(NF)=C$
     +" "+F$+Y$          :REM*168
621Ø NEXTK:IFT<>ØTHEN6Ø6Ø
                         :REM*252
622Ø CLOSE3:CLOSE15:RETURN
                         :REM*118
65ØØ GOSUB91ØØ:PRINTTAB(11)"{CRS
     R DN}DISPLAY DIRECTORY"
                         :REM*219
651Ø PRINTTAB(11)"{2 CRSR DNs}{C
     TRL 9}READING DIRECTORY":GO
     SUB6ØØØ:GOSUB97ØØ   :REM*89
652Ø GOSUB94ØØ:K=1       :REM*123
653Ø GOSUB97ØØ:PRINTTAB(11)"{CTR
     L 9}"N$"{CRSR DN}":J=Ø:IFNF
     <1THEN655Ø          :REM*11
654Ø PRINTTAB(7)D$(K):K=K+1:J=J+
     1                   :REM*249
655Ø IF K<=NF AND J<>1Ø THEN654Ø
                         :REM*159
656Ø IFK>=NFTHENPRINTTAB(12)"{CR
     SR DN}"BF"BLOCKS FREE"
                         :REM*133
657Ø GOSUB 98ØØ:IFX$="*"THEN23Ø
                         :REM*245
658Ø IFX$="{CRSR UP}"ORX$="{UP A
     RROW}"THENK=K-2Ø:IFK<1THENK
     =1                  :REM*245
659Ø IF(K<NF)OR(K=1ANDX$="{CRSR
     UP}")THEN653Ø       :REM*97
66ØØ GOTO23Ø             :REM*211
71ØØ FP=1:P$="PROTECT":GOTO721Ø
                         :REM*239
72ØØ FP=2:P$="UNPROTECT":REM*15Ø
721Ø GOSUB91ØØ:PRINTTAB(14-FP)"{
     CRSR DN}"P$" FILE":PRINTTAB
     (3-FP)"{4 CRSR DNs}FILE TO
     "P$": "             :REM*188
722Ø W=16:R=1Ø:C=21:GOSUB8ØØØ:EX
     =1:FF$=S$:SX$=S$:IFS$=""THE
     N23Ø                :REM*1Ø6
723Ø IFLEN(FF$)<16THENFF$=FF$+CH
     R$(16Ø):GOTO723Ø    :REM*32
724Ø GOSUB6ØØØ:PRINT     :REM*26
725Ø IFEX=ØTHENPRINTTAB(13-FP-LE
     N(SX$)/2)"{2 CRSR DNs}"SX$"
      IS NOW "P$"ED":NN$="":GOTO
     727Ø                :REM*24
726Ø PRINTTAB(11-LEN(SX$)/2)"{2
     CRSR DNs}"SX$" IS NOT ON TH
     E DISK"             :REM*62
727Ø FP=Ø:CLOSE3:CLOSE15:GOSUB98
     ØØ:GOTO23Ø          :REM*1Ø6
75ØØ GOSUB91ØØ:PRINTTAB(14)"{CRS
     R DN}RENAME DISK":GOSUB95ØØ
     :IFER>19THEN23Ø     :REM*221
751Ø GOSUB82ØØ:PRINTTAB(11-LEN(N
     $)/2)"{CRSR DN}CURRENT DISK
      NAME: {CTRL 9}"N$  :REM*49
752Ø PRINTTAB(7)"{2 CRSR DNs}PLE
     ASE INPUT NEW DISK NAME":R=
     13:C=12:W=16:GOSUB8ØØØ
                         :REM*183
753Ø IFLEN(S$)=ØTHENCLOSE3:CLOSE
     15:GOTO23Ø          :REM*235
754Ø IFLEN(S$)<16THENS$=S$+CHR$(
     16Ø):GOTO754Ø       :REM*23
755Ø PRINT#15,"B-P:3,144":PRINT#
     3,S$;:PRINT#15,"U2:3,Ø,18,Ø
     ":CLOSE3            :REM*149
756Ø GOSUB96ØØ:IFER>19THENCLOSE3
     :CLOSE15:GOTO23Ø    :REM*253
757Ø PRINT:PRINTTAB(9)"{3 CRSR D
     Ns}DISK HAS BEEN RENAMED":P
     RINT#15,"I Ø:":CLOSE15
                         :REM*175
758Ø FORK=1TO3ØØØ:NEXT:GOTO23Ø
                         :REM*2Ø9
8ØØØ GOSUB9ØØØ:PRINT"{CRSR LF}>{
     CTRL 9}"MID$(BL$,1,W)"{CTRL
      Ø}<{CTRL 9}";:GOSUB9ØØØ:N=
     Ø:S$=""             :REM*245
8Ø1Ø POKE2Ø4,Ø:GETX$:IFX$=""THEN
     8Ø1Ø                :REM*241
8Ø2Ø POKE2Ø4,1:POKE212,Ø:X=ASC(X
     $):IFX<>13THEN8Ø5Ø  :REM*33
8Ø3Ø PRINT"{CTRL 9} ";:IFLEN(S$)
     =WTHENPRINT"{CRSR LF}{CTRL
     Ø}<";               :REM*237
8Ø4Ø PRINT:RETURN        :REM*167
8Ø5Ø IFX<>2ØORN=ØTHEN8Ø9Ø
                         :REM*137
8Ø6Ø N=N-1:S$=MID$(S$,1,N):GOSUB
     9ØØØ:PRINT"{CTRL 9}"S$;:POK
     E212,Ø:PRINT"{2 SHFT SPACEs
```

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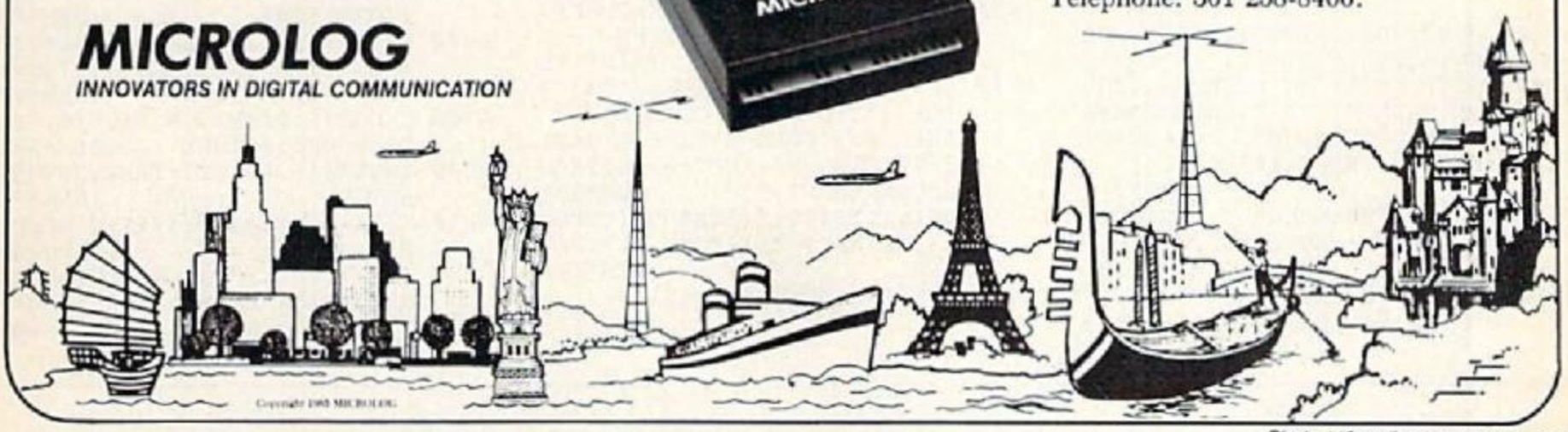

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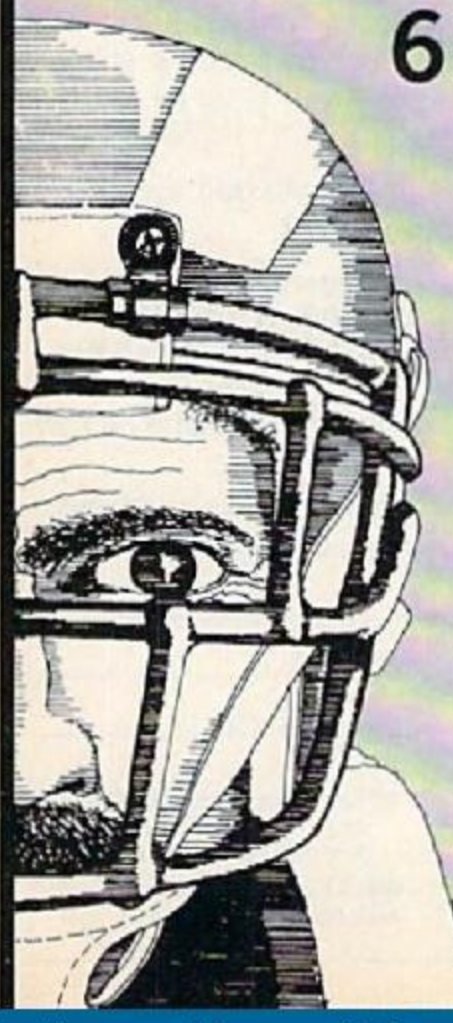

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Listing 1 continued.

```
    }{CRSR LF}";          :REM*181
8070 IFLEN(S$)=W-1THENPRINT"{CTR
    L 0}<";               :REM*255
8080 C=C+N:GOSUB9000:C=C-N:GOTO8
    010                   :REM*99
8090 IFN=WTHEN8010        :REM*199
8100 IF(X>31ANDX<129)OR(X>161)TH
    ENPRINTX$;:S$=S$+X$:N=N+1
                          :REM*215
8110 GOTO8010             :REM*235
8200 CLOSE3:OPEN3,8,3,"#":N$="":
    PRINT#15,"U1:3,0,18,0":PRIN
    T#15,"B-P:3,144"      :REM*246
8210 FORK=1TO16:GET#3,X$:IFASC(X
    $)=160THENX$="{SHFT SPACE}"
                          :REM*120
8220 N$=N$+X$:NEXT:GET#3,X$:GET#
    3,X$:GET#3,X$:GET#3,Y$:N$=N
    $+" ("+X$+Y$+")"      :REM*94
8230 RETURN               :REM*128
8500 GOSUB9100:PRINTTAB(13)"{CRS
    R DN}CLEAN UP DISK"   :REM*83
8510 F2=0:PRINTTAB(11)"{CRSR DN}
    {CTRL 9}READING DIRECTORY":
    GOSUB6000             :REM*217
8520 GOSUB9400:FORK=1TONF:D%(K)=
    0:NEXT:R=11:C=29:W=1:K=1
                          :REM*95
8530 GOSUB9700:PRINTTAB(7)"{CRSR
     DN}{CTRL 9}"D$(K)    :REM*17
8540 PRINTTAB(8)"{2 CRSR DNs}DEL
    ETE THIS FILE? ";:GOSUB8000
    :IFS$=""THEN2300      :REM*61
8550 IFS$="Y"THEND%(K)=1:F2=1
                          :REM*253
8560 IFS$="*"THEN8580     :REM*21
8570 K=K+1:IFK<=NFTHEN8530
                          :REM*103
8580 GOSUB9700:PRINTTAB(7)"{4 CR
    SR DNs}VALIDATE THE DISK?{S
    ""THEN2300            :REM*147
8590 IFF2THENGOSUB9700:PRINTTAB(
    12)"{2 CRSR DNs}{CTRL 9}DEL
    ETING FILES"          :REM*139
8600 CLOSE15:OPEN15,8,15:FORK=1T
    ONF                   :REM*1
8610 IFD%(K)=0THEN8660    :REM*121
8620 F$=MID$(D$(K),5,16):I=1
                          :REM*191
8630 IFASC(MID$(F$,I,1))=160THEN
    F$=MID$(F$,1,I-1):GOTO8650
                          :REM*141
8640 I=I+1:IFI<=16THEN8630
                          :REM*175
8650 PRINT#15,"S0:"+F$    :REM*77
8660 NEXT:IFF2ORS$="Y"THEN NN$="
    "                     :REM*45
8670 IFS$="Y"THENGOSUB9700:PRINT
    TAB(14)"{2 CRSR DNs}{CTRL 9
    }VALIDATING":PRINT#15,"V0:"
                          :REM*55
8680 CLOSE15:GOTO2300     :REM*193
9000 POKE783,0:POKE781,R:POKE782
    ,C:SYS65520:RETURN    :REM*59
9080 REM GET CURSOR POSITION
                          :REM*49
9090 POKE783,1:SYS65520:R=PEEK(7
    81):C=PEEK(782):RETURN
                          :REM*115
9100 PRINT"{SHFT CLR}{CRSR DN}"T
    AB(12)"{CTRL 9}{COMD A}{13
    SHFT *s}{COMD S}":PRINTTAB(
    12)"{CTRL 9}{SHFT B} DISK M
    ASTER {SHFT B}"       :REM*251
9110 PRINTTAB(12)"{CTRL 9}{COMD
    Z}{13 SHFT *s}{COMD X}":RET
    URN                   :REM*109
9200 R=6:C=2:GOSUB9000:X=10
                          :REM*167
9210 PRINTTAB(X)"1) DISPLAY DIRE
    CTORY"                :REM*81
9220 PRINTTAB(X)"2) MAKE DISK LA
    BEL"                  :REM*248
9230 PRINTTAB(X)"3) CLEAN UP DIS
    K"                    :REM*248
9240 PRINTTAB(X)"4) PROTECT FILE
    "                     :REM*170
9250 PRINTTAB(X)"5) UNPROTECT FI
    LE"                   :REM*158
9260 PRINTTAB(X)"6) RENAME DISK"
                          :REM*100
9270 PRINTTAB(X)"7) FORMAT NEW D
    ISK"                  :REM*152
9280 PRINTTAB(X)"8) SEND DISK CO
    MMAND"                :REM*234
9290 PRINTTAB(X)"9) EXIT{2 CRSR
    DNs}"                 :REM*16
9300 PRINTTAB(13)"SELECTION:{4 S
    PACEs}{2 CRSR LFs}";:GOSUB9
    090:W=1:GOSUB8000:X=VAL(S$)
                          :REM*48
9310 IFX>0ANDX<10THENRETURN
                          :REM*168
9320 PRINT:PRINT"{CRSR DN}"TAB(4
    )"{CTRL 9}CHOOSE A NUMBER B
    ETWEEN 1 AND 9{4 CRSR UPs}"
    :GOTO 9300            :REM*64
9400 N2=INT(NF/256):N1=NF-N2*256
    :POKE49366,N1:POKE49367,N2:
    SYS49152:RETURN       :REM*20
9500 CLOSE15:OPEN15,8,15,"IO:":G
    OSUB9600:RETURN       :REM*159
9600 INPUT#15,ER,ER$:IFER<20THEN
    RETURN                :REM*73
9610 X=14-LEN(ER$)/2:IFX<0THENX=
    0                     :REM*243
9620 PRINTTAB(X)"{2 CRSR DNs}{CT
    RL 9}DISK ERROR: "ER$:REM*7
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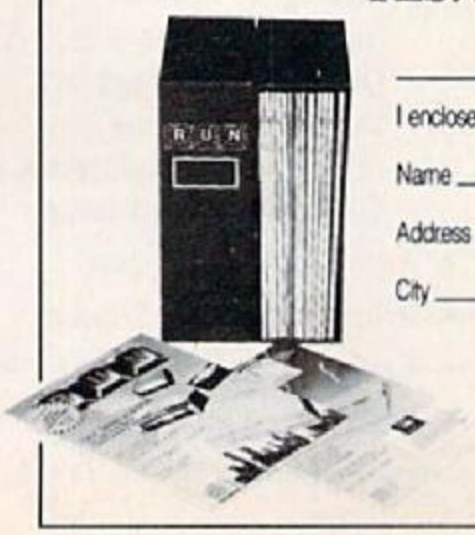

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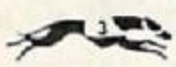

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Listing 1 continued.

```
963Ø IFER=21ORER=74THENPRINT"{6
     SPACEs}{CTRL 9}MAKE SURE DI
     SK IS IN DRIVE"      :REM*25
964Ø GOSUB 98ØØ           :REM*99
97ØØ POKE781,7:SYS828:RETURN
                          :REM*2Ø5
98ØØ R=22:C=Ø:GOSUB9ØØØ:PRINT"{8
      SPACEs}{CTRL 9}PRESS ANY K
     EY TO CONTINUE":POKE198,Ø
                          :REM*1Ø6
981Ø GETX$:IFX$=""THEN981Ø
                          :REM*244
982Ø RETURN               :REM*188
9999 PRINT"{SHFT CLR}":CLOSE3:CL
     OSE15:END            :REM*122
1ØØØØ DATA 173,214,192,2Ø8,6,173
      ,215,192,2Ø8,1,96,165,47,2
      4,1Ø5,1Ø,133,34,165:REM*15
1ØØ1Ø DATA 48,1Ø5,Ø,133,35,76,16
      3,192,16Ø,Ø,177,34,72,177,
      36,145,34,1Ø4,145,36
                          :REM*123
1ØØ2Ø DATA 2ØØ,192,3,2Ø8,241,76,
      116,192,169,Ø,141,218,192,
      168,177,34,24Ø,59 :REM*2Ø5
1ØØ3Ø DATA 141,213,192,177,36,24
      Ø,219,2Ø5,213,192,176,8,14
      1,213,192,169,1,141
                          :REM*121
1ØØ4Ø DATA 218,192,2ØØ,177,34,13
      3,251,177,36,133,253,2ØØ,1
      77,34,133,252,177,36
                          :REM*1Ø9
1ØØ5Ø DATA 133,254,16Ø,Ø,177,253
      ,2Ø9,251,144,18Ø,2Ø8,11,2Ø
      Ø,2Ø6,213,192,2Ø8  :REM*65
1ØØ6Ø DATA 242,173,218,192,2Ø8,1
      67,165,36,24,1Ø5,3,133,36,
      165,37,1Ø5,Ø,133,37
                          :REM*147
1ØØ7Ø DATA 173,216,192,2Ø8,3,2Ø6
      ,217,192,2Ø6,216,192,173,2
      16,192,2Ø8,158,173:REM*233
1ØØ8Ø DATA 217,192,2Ø8,153,165,3
      4,24,1Ø5,3,133,34,165,35,1
      Ø5,Ø,133,35,173,214
                          :REM*217
1ØØ9Ø DATA 192,2Ø8,3,2Ø6,215,192
      ,2Ø6,214,192,173,214,192,2
      Ø8,6,173,215,192,2Ø8:REM*3
1Ø1ØØ DATA 1,96,173,214,192,141,
      216,192,173,215,192,141,21
      7,192,165,34,24,1Ø5:REM*67
1Ø11Ø DATA 3,133,36,165,35,1Ø5,Ø
      ,133,37,76,47,192  :REM*85
2ØØØØ DATA 16Ø,Ø,24,32,24Ø,255,1
      65,2Ø9,133,251,165,21Ø,133
      ,252,169,232,197,251
                          :REM*6Ø
2ØØ1Ø DATA 2Ø8,7,169,7,197,252,2
      Ø8,1,96,169,32,145,251,23Ø
      ,251,2Ø8,235,23Ø,252
                          :REM*164
2ØØ2Ø DATA 2Ø8,231         :REM*234
3ØØØØ DATA 162,3,32,198,255,162,
      Ø,16Ø,16,32,228,255,2Ø1,13
      ,2Ø8,2,169,16Ø,157:REM*117
3ØØ1Ø DATA 179,195,232,136,2Ø8,2
      4Ø,32,2Ø4,255,32,165,195,1
      69,16,145,251,2ØØ :REM*115
3ØØ2Ø DATA 169,179,145,251,2ØØ,1
      69,195,145,251,96,32,165,1
      95,16Ø,Ø,177,251,17Ø
                          :REM*247
3ØØ3Ø DATA 2ØØ,177,251,133,253,2
      ØØ,177,251,133,254,16Ø,Ø,2
      32,2Ø2,2Ø8,1,96,177:REM*83
3ØØ4Ø DATA 253,2Ø1,16Ø,2Ø8,4,169
      ,32,145,253,2ØØ,76,147,195
      ,24,165,45,1Ø5,2,133
                          :REM*59
3ØØ5Ø DATA 251,165,46,1Ø5,Ø,133,
      252,96               :REM*1
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end R

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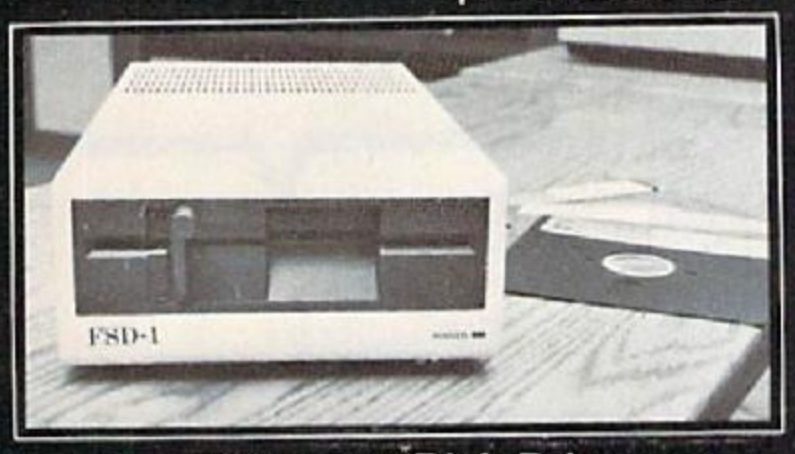

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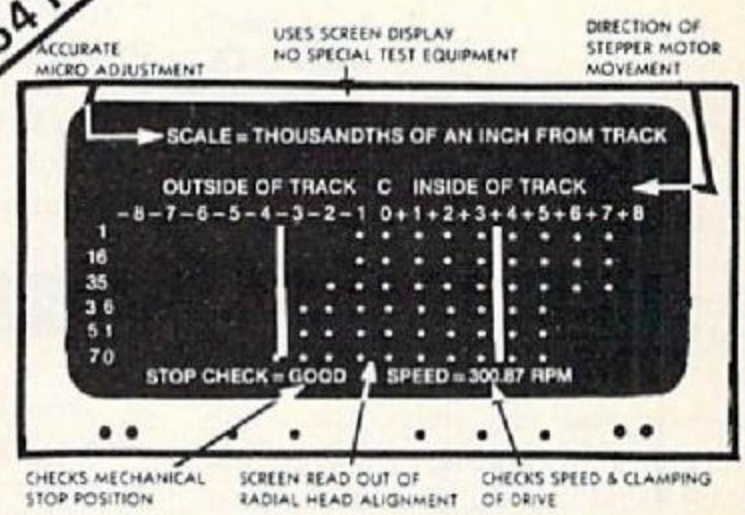
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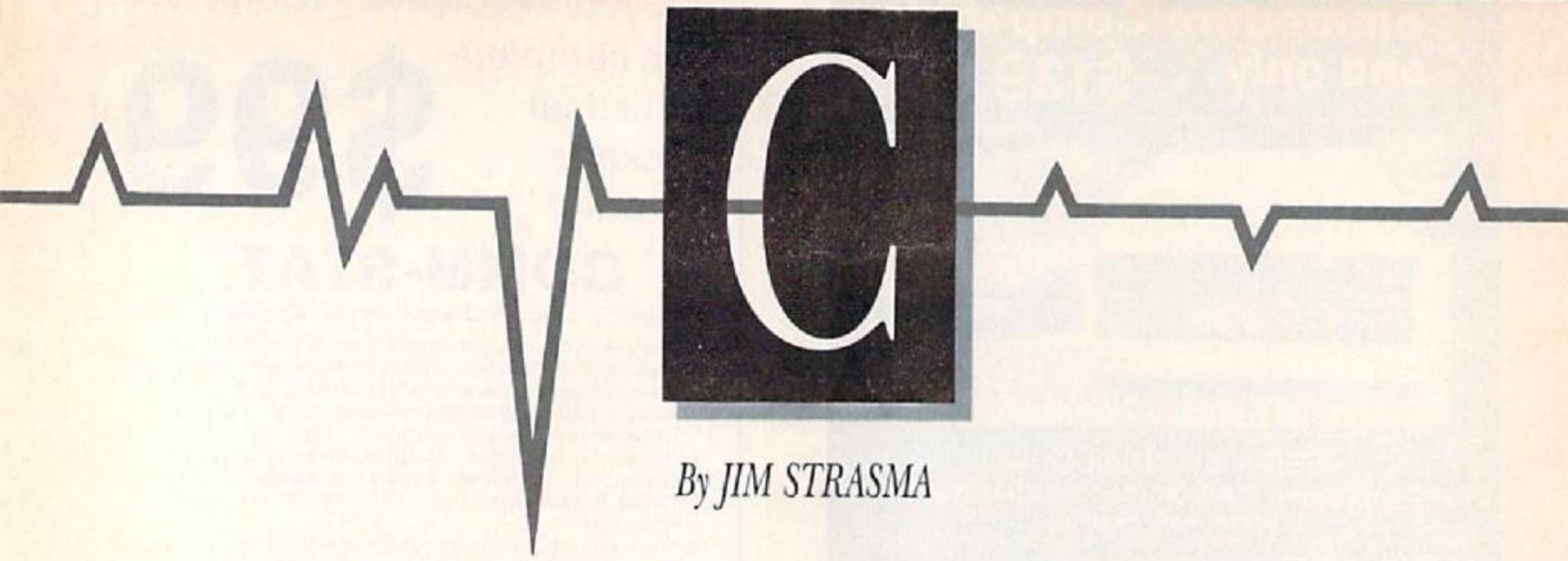

By JIM STRASMA

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Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

HARDWARE

***Q:** I have an SX-64 and want to know what difference there is, if any, between it and the C-64.*

J. Isbell
Austin, TX

A: Apart from the obvious difference—the SX-64 has a built-in color monitor and disk drive—the two machines barely differ. There are slight differences in the SX-64's Kernal ROM that cause some incompatibility with copy-protected software. However, you can overcome these differences by adding a switchable Kernal ROM that includes a standard Rev. 3 C-64 Kernal. This will also change the SX's screen color from white to the standard blue, so as to avoid problems with programs that assume a blue background and use white text.

Also, the keyboards have a slightly different touch, and the 1541 has a built-in reset switch, but these differences should not have any effect on programs.

***Q:** I understand that the 1571 disk drive will read and write IBM DOS disk formats under the C-128's CP/M mode. Can the format be read and written under the C-128 mode?*

Jerry Mulherin
Kaneohe, HI

A: I haven't heard of anyone successfully reading a PC-DOS-format disk on the C-128 yet, although I expect it will be done; it's already been done for some other CP/M machines, such as the Osborne and Kaypro, via commercial programs like Uniform and Media Master. The IBM format that Commodore supports on the C-128 is a CP/M format, not PC-DOS.

Getting at CP/M disk formats from the C-128 side of the machine isn't easy, but it is possible, using the 1571's new Burst mode. However, the needed read and write commands require the speed of machine language control and aren't at all a project for the faint-hearted.

PROGRAMMING

***Q:** When programming, I often work with dates and need to add certain amounts of time to a given calendar date. My programs have become cumbersome from my having to deal with 30 or 31 days per month, 28 days for February, adding 1 day in leap years, and so on. Can you advise me on how I might better handle this kind of date calculation?*

Donald Izzi
Laurel Springs, NJ

A: In calculating dates, the trick is to use a common unit of measurement throughout. Since you want to know, to the nearest day, the time between two events, it will help if you first convert Gregorian dates (years and months and days) into so-called Julian days.

The zero, or beginning point, in your calculations can be any date earlier than all other dates to be considered. For example, many simple Julian date programs use January 1, 1900 as their zero point. These programs calculate the number of days between events by first converting both of the dates in question into the number of days that intervene between each one and January 1, 1900. They then subtract the smaller number of days from the larger to find the elapsed time. The results are valid for any time in the 20th century.

Following are two short program segments to help you use Julian dates.

Given a numeric day, month and year in variables DA, MO and YR, the first set of lines will return a Julian day in variable JU.

```
1000 YR = YR + 1900
1010 JU = INT(30.57 * MO) + INT(365.25
     * YR - 395.25) + DA
1020 IF MO > 2 THEN JU = JU - 1:IF
     INT(YR / 4) * 4 <> YR THEN JU =
     JU - 1
```

Similarly, the next set of lines, given JU and using LD as a temporary leap-day variable, will return DA, MO and YR.

```
2000 YR = INT(JU / 365.26) + 1
2010 DA = JU + INT(395.25 - 365.25 *
     YR)
2020 LD = 1
2030 IF INT(YR / 4) * 4 <> YR THEN LD
     = 2
2040 IF DA > (91 - LD) THEN DA = DA
     + LD
```


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```
2050 MO = INT(DA / 30.57)
2060 DA = DA - INT(30.57 * MO)
2070 IF MO > 12 THEN MO = 1:YR =
     YR + 1
2080 YR = YR - 1900
```

Q: When using a C-64 with a 1541 disk drive, can I load and run a PET Basic program that's on a 2031 disk, and vice versa?

Don Nyre
Newport Beach, CA

A: Going from the PET to a VIC, C-64, Plus/4, B-128 or C-128 should be no problem, as long as the program itself doesn't need any changes, which it won't unless it includes one or more of the "fatal five" commands (Peek, Poke, Wait, SYS and USR). Going the other way will require a bit more effort.

When you load a PET program into any of the newer machines, they relocate it as necessary to put it into their own Basic workspace, which varies from machine to machine. This is automatic, so you needn't worry about it. Simply save the program on a 2031 disk, put the same disk into your C-64 and load normally.

Going the other way depends on the model. Essentially, you must either convince your newer model that Basic programs begin where they do on the PET, or else convince the PET that its programs begin where they do on the C-64, or whichever machine. In both cases, it's a matter of Poking a new value into the start-of-Basic pointer in page zero of memory, a $00 byte into the memory location prior to the new Basic work space and then doing a Basic NEW.

Specifically, if you were to give the commands:

```
POKE 1024,0
POKE 41,8
NEW
```

on the PET, you'd then be able to load, list and run compatible programs that were written on the C-64, as long as they fit within the PET's smaller memory.

Q: When I type in programs, I always use as many keyword abbreviations as possible. I've been told this saves memory. Invariably, though, I have to make corrections, and when I list the lines, they appear unabbreviated. Have I scrubbed the abbreviations by listing and editing?

Tom Hedges
Ft. Mitchell, KY

A: Not at all. Although keyword abbreviations are quite handy, they have almost nothing to do with the amount of memory used by Basic statements. Once you press the return key on a line, abbreviated or not, it is converted into a token that's even more abbreviated. In this form, each Basic keyword requires only *one* character space in memory. However, since full words are needed when you list the program, the List command expands tokens in the listing itself into equivalent Basic words, without altering the program in memory.

Feel free to use keyword abbreviations, but do so to save typing or to cram more on to a single program line, not to cut the amount of memory used to store a Basic keyword.

Q: I recently saw an Apple IIc demo and was impressed by the speed and smoothness of the animation, which included a flower being pollinated, an amoeba moving and a stick man running.

Since I own a C-128, which supposedly has excellent graphics, I decided to do the same animations on my machine. This was not as easy as it looked. Sprites were too small, and using Basic 7.0 to draw a shape on the hi-res screen and then erasing it to draw a slightly different shape turned out to be too slow.

How is Apple able to perform this amazing animation, and how would I be able to duplicate this on the 128? I refuse to believe my Commodore is inferior to an Apple.

Serge Delic
Toronto, Ontario
Canada

A: Most likely, the Apple demo was written in assembly language, typically a hundred times faster than Basic in animation chores. The demo may also have taken advantage of a common graphics trick—showing one screen page while drawing another, then swapping them. That way, viewers can't see lines as they are drawing.

If you don't feel up to assembly language yet, you can speed up your Basic program by compiling it. Abacus Software now has a Basic compiler for the C-128, called Basic-128.

Another good solution is to use a commercial animation program. Reston Software's Movie Maker would be suitable in C-64 mode and able to animate almost any desired scene. You might also be interested in Mindscape's Show Director, which my ten-year-old son finds especially interesting and easy to use.

REPAIRS

Q: When I contacted my local authorized repair service, I was told that it would cost $74 just to open my C-64. I thought that a little high for a $139 unit. The service people also refused to sell me a 6526 chip over the counter. Could you give me an address where I could purchase the chip?

Bob Prosser
Chicago, IL

A: Jameco Electronics (1355 Shoreway Road, Belmont, CA 94002, 415-592-8097), with whom I have had good dealings for several years, now sells the 6526 and several other key chips for the C-64, along with a full line of general-purpose IC chips.

Q: I have a C-64, 1702, 1541 and Gemini 10X printer with +G interface, all plugged into a Scooter Guard-It control center. From time to time, one or more of the characters on my screen changes color spontaneously.

This has happened when I first turn on the system in the morning, so overheating isn't the cause. Shutting off the computer for a minute usually doesn't get rid of the problem and often creates it. Someone suggested that the cause might be outside interference, but I haven't been able to find any probable source. Any ideas?

Brian Leekley
Winthrop Harbor, IL

A: Most likely, your problem is a weak color memory chip, a 2114 RAM. The C-64 uses two of these chips, and you can buy them for about a dollar each at almost any electronics parts store, including Jameco, mentioned above. Have someone skilled in electronics handle the replacement, making sure

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that each new chip is socketed (in case you ever have to change one again).

However, before replacing anything, try unplugging your printer interface, disk drive and printer from both the computer and your control center. If that prevents the problem, you may be overloading either the C-64 power supply or the control center.

SOFTWARE

Q: I enjoy painting signs, and recently received a C-64 as a gift. Is there a program available that would allow me to make signs with differing letter styles, upper- and lowercase and Zoom capabilities?

Jim Hooper
Crescent City, CA

A: One program written especially for sign-painting is the Banner Machine, from Cardinal Software (13646 Jefferson Davis Highway, Woodbridge, VA 22191; 703-491-6502). It contains several different fonts and multiple sizes of letters. Using a dot-matrix printer, you can make signs of any desired length sideways on continuous-feed paper. Just be sure yours is among the half-dozen or so printers it supports.

Q: Is it possible to list a sequential file from the directory? If so, how could I go about it?

Stephen Yue
Monterey Park, CA

A: The easiest way to list a sequential file is with a memory-resident programming aid. For example, "Disk Reader" (*RUN*, May 1986) is such a program. Also, commercially available is SYSRES, from Solidus International (215 W. Holly, Suite 241, Bellingham, WA 98225). It includes both sequential- and program-file-reading commands that work just like the DOS wedge on Commodore's test demo disk. The command

```
@L"yourfile"S
```

lists your sequential file to the current output device (screen, printer or disk).

UPDATES

Update: In regard to the letter from Gilbert Ashburn (Commodore Clinic, March 1986) concerning paper for the 1520, the problem is probably not that the Radio Shack paper is too stiff, but that a full roll is too heavy; the roll is half again as large as the one sold by Commodore. I find that until I've used some of the paper, there is a tendency for it to feed improperly.

The solution is simple: unwind some paper from the roll before printing, so loose paper is being pulled; or simply tear off some of the paper, to reduce the size of the roll a little, and use that paper later.

Irv Cobb
Union Grove, WI

A: Sounds like a good solution, especially since your suggestion arrived as a 1520 printout on the paper you suggest.

Update: A little over a year ago, William Simmons asked how to double-space a document on the Plus/4 with a 1526 printer. I hope he was able to find a simple answer by now. If not, the following may help him:

```
10 OPEN 4,4
20 OPEN 6,4,6
30 FOR I = 54 TO 66 STEP 4
40 PRINT#6,CHR$(I)
50 PRINT#4, "HHHH"
60 NEXT
```

Whenever I want double-spacing on the Plus/4's built-in word processor, I load and run the above program. Then I delete line 50, put in a new sheet of paper and press the F1 key to go to the built-in word processor. From this point on, whenever I send anything to the printer from the word processor with the *P command, it will print out double-spaced. I don't know how or why it works, but it does.

Jeane Fitch
Burlington, MA

A: Very ingenious. Essentially, you are putting the printer itself into double-space mode from Basic with a Print# to secondary address 6, then calling the word processor without resetting the printer. I'm sure many Plus/4 owners will rise up and call you blessed for your tip, then have fun trying to reduce its crucial parts to a single line of Basic. R

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Eliminate Interfaces?

Morton Kevelson's chart ("Your Guide to Printer Interfaces," *RUN*, May 1986) prompted me to write.

I think it is important to note that printer interfaces are one of the most alienating factors in the Commodore world. There are so many combinations of interfaces and printers and their respective DIP switches that it's a nightmare for the experienced user, let alone the novice, to decipher. As software developers, we spend an inordinate amount of time solving interface-related problems.

To alleviate this problem, we provide our customers with the option of a simple direct-connect parallel cable that works with all of our software, including Vizastar and Vizawrite Classic. For a significantly lower price, this cable eliminates the need for any type of interface and, when necessary, the setting of DIP switches.

The cable is very easy to install; it connects the C-64's or C-128's modem port to any ASCII printer's Centronics parallel port, thus enabling your printer to operate at its maximum rate of speed. Unfortunately, you can use this cable with other software only if you incorporate into those programs a machine language routine (with less than 50 bytes), such as the one we use.

This solution has been used and proven successful in Europe for the past three years. In fact, interfaces are almost totally unknown there. Software programs distributed in England, such as Vizastar, Vizawrite, Omniwriter and Superbase, all support this direct-connect cable.

To help make this cable compatible with more software, Solid State Software encourages other developers to include our machine language routine in their programs. The majority of other computers, such as IBM and Apple, do not require complex interfaces—just a direct-connect parallel cable.

We are interested in hearing what Commodore users think of this cable option and if they are willing to help us set it up as an industry-wide standard. Address correspondence to:

Lawrence D. Sayre
Director of Sales
Solid State Software
1125 E. Hillsdale Blvd., Suite 104
Foster City, CA 94404

More on MIDI

I enjoyed Margaret Morabito's review of Passport Designs' MIDI Interface (*RUN*, February 1986). There seems to be considerable interest among professional and amateur musicians (such as myself) in this rather new concept of high-quality digital sound creation.

Ms. Morabito mentioned the possibility of connecting up to four synthesizers to the C-64 via Passport's MIDI interface and The Music Shop software. I own the same components she described (including the Casio CZ-101 synthesizer).

Casio's Cosmo series of synthesizers is capable of producing a number of varied timbres simultaneously when used as slave units. It is possible to use up to eight timbres with the CZ-5000/3000 units, and up to four timbres with the CZ-1000/101 units.

I have been able to produce four timbres at the same time by using just one CZ-101. You may easily accomplish this by following instructions in the synthesizer manual and setting up the proper channels with The Music Shop MIDI setup window. Thus, it is possible for the CZ-101 to use two violins in channel 1, two flutes in channel 2, two trumpets in channel 3 and two basses in channel 4.

I'd like to see more articles on MIDI in *RUN*.

Eric Habeck
Minneapolis, MN

More on Interfaces

The printer interface chart in the May issue generated an unexpected reader response, in that many people interpreted the order in which the interfaces were listed as a relative ranking of overall quality. This is just not so. The position of the interfaces in the table is arbitrary and has no bearing on their relative quality or performance.

Two points should be made with regard to the table as published. First, the Xetec Super Graphix should have a checkmark opposite the ASCII conversion feature in the Setting Switches section of the chart.

Users of CP/M on the C-128 will appreciate this feature in light of the way the C-128 CP/M 3.0 Plus printer driver has been implemented. The CP/M supplied with the C-128 assumes the use of a Commodore printer, so the standard ASCII printer output that all CP/M programs use is automatically converted to Commodore ASCII.

As a result, you must set your printer interface to Commodore-em-

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C-64 interfaces with milling machine to streamline production.

ulation mode to maintain the proper case of printed text. A problem arises when you try to access the special features of your non-Commodore printer. Many CP/M programs give you direct access to features like sub- and superscripts, underlining, italics, and so on. These features are not available on the Commodore 1525.

Hardware selection of ASCII conversion on the interface is one way around this problem. In this mode, only the upper- and lowercase text characters are swapped by the interface, and all other 1525-emulation features are turned off. This allows all printer-control codes to pass through unmolested.

The second point is that the Micro R&D MW-350 has been markedly improved since the table was composed. Its built-in RAM buffer has been increased from 4K to 10K. Also, an accompanying price drop to $89.95 gives the MW-350 the distinction of having the lowest cost per byte of any of the interfaces.

Morton A. Kevelson
Brooklyn, NY

C-64 Shop Talk

I'd like to tell you how the C-64 is being used in my work.

I work as a milling-machine operator. In my shop, we have some numerical control (NC) milling machines, which run on a perforated paper tape (PPT) system. This PPT contains all the information to perform a specified function.

When preparing a PPT, you have to punch all the information on an eight-track tape. This process is time-consuming because, when changes occur, you either have to make a new section and then splice it into the old tape, or make an entirely new one.

To improve the process, I exchanged a PPT for a C-64. It is connected to the milling machine by 33 air hoses and about the same amount of electrical wires. The photo shows the system (C-64, 1541, monitor and modem) mounted on a small shop truck.

The software we use permits the machine to operate in both manual and automatic modes. With the C-64 off, the machine still runs on the original PPT system.

Jerry W. Skibinski
Chicago, IL

Fantastic

I just typed in and ran Robin Franzel's BasicAid loader program ("64 BasicAid," *RUN*, December 1985), which provides an enhanced Basic. I can only describe it in one word: fantastic!

I have had my C-64 for about three months now and have tried numerous magazine programs. None compare with 64 BasicAid. It has given me a whole new respect for my computer.

David Rhymes
Branford, CT

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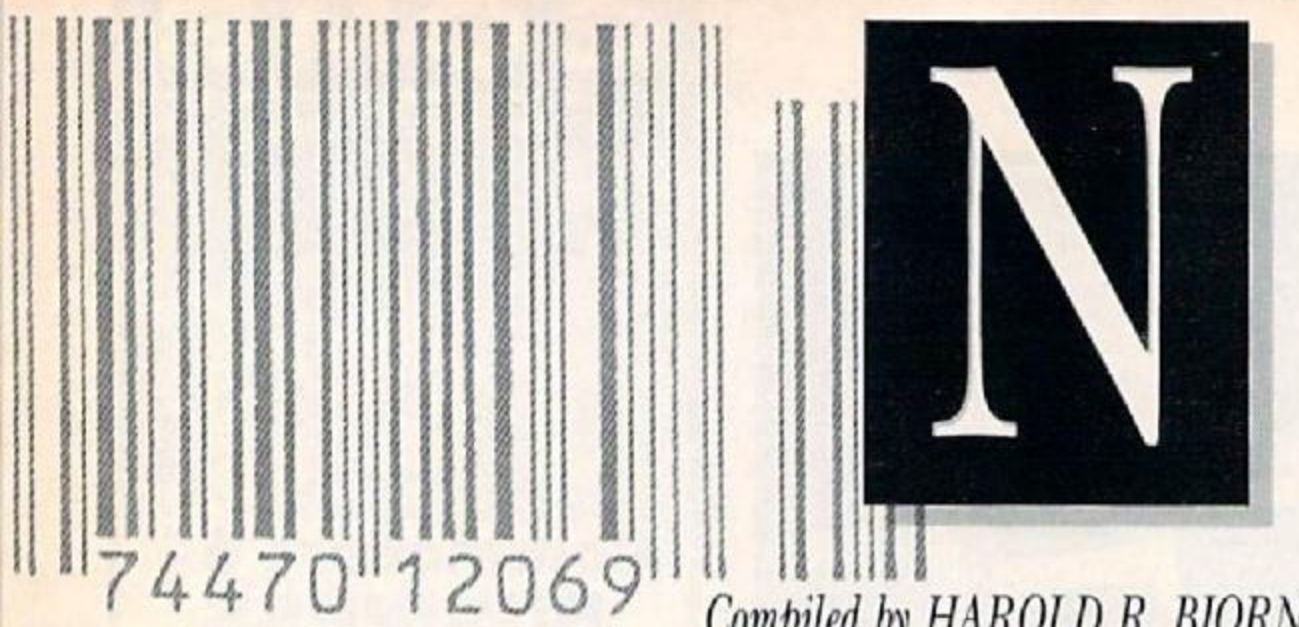

Compiled by HAROLD R. BJORNSEN

Disk Assistant

Disk Assistant is a new utility program for your C-64 that simplifies disk commands. All disk operations can be performed with a single keystroke. It is fully menu-driven, and the main menu offers 15 disk options, including disk format, validate, erase and rename files.

Sequential data files can be easily viewed or printed, as well as copied from one disk to another. Options are included for copying on single, as well as dual, disk drives. Available for $11.95 from Spectrum 1 Network, 9161 Beachy Ave., Arleta, CA 91331.

Check Reader Service number 406.

Hidden Assets

Cardco (300 S. Topeka, Wichita, KS 67202) has released Hidden Assets, a utility software program for the C-64. The disk includes a calculator, which performs full math functions, including logarithms, square roots, integers and trig functions; memo pad; appointments calendar; telephone directory; alarm clock; disk utilities; and programmer's utilities, which include a machine language monitor, mini editor/assembler, hex/decimal/ASCII conversion tables and seven others. The package is available for $79.95.

Check Reader Service number 412.

Bulletin Board System

Blue Board (SOTA Computing Systems, Ltd., 213-1080 Broughton St., Vancouver, BC, Canada V6G 2A8) is a bulletin board system for the C-64, a compatible disk drive and 300-baud auto-answer modem. It supports over 200 on-line messages of up to 1023 characters each, up to 220 users and over 25 SYSOP-definable sub-boards.

Blue Board is written entirely in machine language and employs highly optimized disk drive routines. Other features include remote SYSOP access, a private SYSOP subboard and unlimited connect time during a session. Each of these features is password-protected for system security. Available for $69.95 (in U.S. funds).

Check Reader Service number 409.

Trans Com's 300/1200 modem.

Modem Times

The TCM-1200 modem, for the C-64, features automatic speed selection of 300 or 1200 baud rates. It is compatible with most 1650-type software and permits message review or file send-and-receive at a fraction of the time required at 300 baud.

The modem connects directly to the user port, eliminating the need for an additional RS-232 interface. The package includes software, upload and download with new Punter protocol, automatic 300/1200 baud selection, nine-number phone directory, 16K receive buffer, plus autodial and redial.

The TCM-1200 modem is available for $199.95 from Trans Com, Inc., 703-13 Annoreno Drive, Addison, IL 60101.

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And Now the News

Facts on File World News Digest is now available through Dialog Information Services and Vu/Text Information Services. Facts on File culls its material from major newspapers around the world, government publications and leading journals.

The digest is divided into four sections: international affairs, U.S. affairs, world news and miscellaneous, which covers such items as sports, medicine and the arts.

Facts on File World News Digest may be searched on Dialog for $60 per connect hour and for 25 cents per full record printed offline, and on Vu/Text for $60 per connect hour. Facts on File, Inc., 460 Park Avenue South, New York, NY 10016.

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In addition, the programs display a year-by-year cash flow analysis and compute a revised internal rate of return, which includes the effects of reinvesting the after-tax cash flow from the investment at a rate you select. Available on disk for the C-64 at $89. Larry Rosen Co., 7008 Springdale Road, Louisville, KY 40222.

Check Reader Service number 405.

Leroy's Cheatsheet.

Cheatsheets 128

Cheatsheet Products (PO Box 111368, Pittsburgh, PA 15238) introduces Leroy's Cheatsheets for the C-128. The new designs are for Basic 7.0 commands, 1571 disk drive commands, and for the commercial programs Easy Script, Fleet Systems 2 and 3, PaperClip 128 and Wordpro.

Also available are blank keyboard overlays in sets of three. A keyboard extender to use with the new cheatsheets is included free with every order purchased from the company. Leroy's Cheatsheets are $7.95 each, plus $1 shipping per order.

Check Reader Service number 401.

Speech Therapy

A speech editor has been added to the standard driver software supplied with the Voice Master speech and music processor system.

The additional routines permit you to edit and modify the amplitudes of stored speech templates in order to improve the quality and intelligibility of digitized speech during playback.

The package is available on disk for the C-64 for $89.95. Current owners of Voice Master (Version 3.0 and higher) may update the program to include the speech editor by contacting Covox, 675-D Conger St., Eugene, OR 97402. The cost is $10.

Check Reader Service number 407.

Fun from Firebird

Firebird (PO Box 49, Ramsey, NJ 07446) introduces to America several software games and two music programs from England.

Frankie Goes to Hollywood, "The Pleasure Game," is a mind game in which you begin devoid of shape or personality ($32.95); Colossus Chess IV, which includes 3000 opening positions and examines an average of 300 moves per second ($34.95); and a two-game package, featuring Gerry the Germ, a virus who takes a lighthearted romp through the human body, and Microcosm, which has you defending a priceless agricultural cargo against a hoard of mutant insects ($19.95).

The Music System includes multivoicing, Monophonic and Polyphonic modes, full editing and recording capabilities, storage and playback of sound settings and compositions ($39.95). An advanced version of The Music System includes additional features plus MIDI capabilities and the ability to print sheet music ($79.95).

Each package is available on disk for the C-64.

Check Reader Service number 400.

Conflict in Vietnam

Conflict in Vietnam, a war strategy game for the C-64, presents five separate games that chronicle the pivotal events in the war from the end of French rule at Dien Bien Phu in 1954 to the North Vietnamese assault on Quang Tri in 1972. The three decisive battles—Ia Drang (1965), Khe Sanh (1968) and Cambodia (1970)—illustrate the various stages of intense involvement by the United States. These scenarios can be played independently or in chronological order, utilizing the narrative sections of the 110-page documentation included with the program.

You direct the constantly moving armies as they fight across a scrolling map. Judicious use of air power, air-mobile infantry and artillery is required to counter the hit-and-run guerilla tactics of the elusive Viet Cong. You can also take command of the North Vietnamese side and play against computer-controlled American forces. Available on disk for $39.95 from MicroProse Software, 120 Lakefront Drive, Hunt Valley, MD 21030.

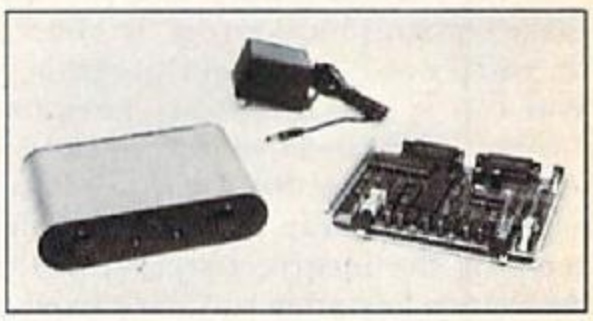
Check Reader Service number 402.

Ramjet, from Omnitronix.

Omnitronix Releases

Omnitronix (PO Box 43, Mercer Island, WA 98040) introduces the Ramjet print buffer and a micro controller for the C-64.

The print buffer comes standard with a full 256K of buffer memory. It is connected between the computer and printer and comes in either serial or parallel versions. Available for $269.



Omnitronix' micro controller.

Also available is a stand-alone Z-80-based RS-232 micro controller for commercial applications. The board provides 8K of Eprom, one bank of dynamic RAM and two bidirectional asynchronous RS-232 serial ports. The RAM addressing supports your choice of either 16K, 64K or 256K RAM. The controller is available as a complete programmer's kit, or the company can give you a quote on your custom programming and development needs. The single-piece price for the kit is $349.

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Learn to Walk Before You RUN

We receive many letters from new Commodore owners who want to learn the first steps in using their computers. For these first-time users, we present the following step-by-step list of things that all beginners should be aware of as they start typing in programs.

1. Before you can use a fresh disk, you have to format it. First turn on your disk drive, then insert the disk, close the latch and type:

OPEN15,8,15 <Press Return>
PRINT#15,"N0:NAME,##" <Press Return>

The ## is a two-character identification number that can be any combination of letters and/or digits. "NAME" can be any title for your disk that you choose, but it must not exceed 16 characters. Wait for a few minutes while the disk spins inside the drive, being formatted. When the disk stops spinning, type:

CLOSE15 <Press Return>

C-128 owners can shorten this procedure by simply typing:

HEADER "NAME,##" <Press Return>

Caution: The formatting process erases all material already on the disk, so if you're formatting a used disk, make sure it doesn't contain any programs you want to save. See item 7, below, on reading the disk directory.

2. As a beginner, you should start entering short Basic programs. Avoid machine language listings and very lengthy Basic programs until you get the hang of what you're doing. We have a checksum program (Perfect Typist) which actually proofreads your typing and tells you when you make a mistake. You should type in Perfect Typist before you enter any programs. See directions below.

3. Remember to press the return key after each programming line you type in.

4. As you are typing in a program, you are likely to make typographical errors. To check what you have typed in, you'll need to list your program's lines on the screen. You can specify the exact lines that you want to see. Typing LIST 10–50 will list lines 10 through 50. LIST 20 will list only line 20. If you see an error in one of your listed lines, you can fix it by using the INST/DEL key and retyping the incorrect section of the line. Always press the return key after you have fixed a line.

5. Be sure to save what you have typed in before turning off your computer. To save any partial or complete Basic program listing to your disk, type:

SAVE "NAME",8 <Press Return>

C-128 owners can press F5, type in the program name, and press the return key.

Note: As you save subsequent versions of the same program, you need to make a slight change in the program name each time. You might simply add version numbers to the end of the program name (PROGRAM.1, PROGRAM.2, etc.).

6. While working on a program, you may develop several versions before you're satisfied that you have it in final form. After you *do* achieve that final version, you might want to go back and erase the old, incomplete versions from your disk. Erasing unwanted programs is called scratching. (Be sure not to erase your final version!) To scratch a program, type:

OPEN15,8,15 <Press Return>
PRINT#15,"S0:prog.name" <Press Return and wait a few seconds>
CLOSE15 <Press Return>

7. After you have saved several programs to your disk, you will need to see their names so that you can load the one you want. To get the complete list (the disk directory) of all the program names on your disk, type:

LOAD "$",8 <Press Return>

Then type LIST to actually see the directory. C-128 owners simply press F3.

8. When you know what program you want to load into your computer, type:

LOAD "NAME",8 <Press Return>

C-128 owners can just press F2, type in the program name, and press the return key.

9. After you have loaded a program, type RUN to actually use the program.

How to Type Listings from *RUN*

To simplify your typing of *RUN*'s C-64 and C-128 program listings, we include checksum numbers. These numbers follow a REM statement at the end of each line (e.g., :REM*123). These checksum numbers necessitate your using *RUN*'s Perfect Typist programs, listed below. Use 64 Perfect Typist for C-64 programs and 128 Perfect Typist for 128 Mode programs on the C-128.

Type in 64 Perfect Typist (Listing 1) or 128 Perfect Typist (Listing 2) and save it to either tape or disk before running. When you want to type in a 64- or a 128-mode program, first load and run the appropriate Perfect Typist listing. Two SYS numbers will be displayed on your screen. Jot these down and keep them handy. They are the SYS numbers that you type in for deactivating and reactivating the checksum program.

After Perfect Typist has been loaded and run, start typing in the program listing from *RUN* as you normally do. The only difference is that now, after you press the return key to log in each line, a 1-, 2- or 3-digit number will appear below the line on the left margin. This is the checksum number, ranging from 0 to 255.

If this number matches the checksum number printed in the listing after the :REM*, then you know you have typed that line correctly. Then you type the next program line right over the previous line's checksum value. If the checksum numbers do not agree, analyze your line on screen for any typographic errors or omissions. Make the needed changes and press the return key again to log in those changes. A new checksum number will appear in place of the old one. Compare this to the magazine's number and then proceed to the next line.

When you've finished typing in your program, disable the Perfect Typist by typing in the appropriate SYS number for either 64 or 128 mode, and press the return key. Now you can save your program as usual, to disk or tape. (Before you attempt to run your new program, turn your computer off and back on to completely clear out the Perfect Typist program.)

You may save an incomplete program any time and continue it later. You will have to reload and run the Perfect Typist program, then load the incompleted pro-

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gram that you were working on, list it, and continue where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in *RUN* have been translated so that the graphics and control characters are designated as understandable key combinations. When you see instructions inside curly brackets, such as {SHIFT L}, you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACEs}, which instructs you to press the space bar 22 times.

Listing 1. *64 Perfect Typist program.*

```
1 REM 64 PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17013
7 REM
10 POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
20 PG=PEEK(56):ML=PG*256+60
30 FORX=ML TO ML+154:READD:T=T+D:POKEX,D:NE
   XT
40 IFT<>16251 THEN PRINT"ERROR IN DATA...":
   END
60 POKEML+4,PG:POKE ML+10,PG:POKE ML+16,PG
70 POKE ML+20,PG:POKE ML+32,PG:POKE ML+38,P
   G
80 POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}**************
   ************************"
90 SYS ML:PRINT "{CRSR RT}** 64 PERFECT TYP
   IST IS NOW ACTIVE{2 SPACEs}**"
100 PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs}
    SYS"ML+30"=OFF **"
101 PRINT"{CRSR RT}**********************
    **************":NEW
110 DATA 173,005,003,201,003,208,001,096
120 DATA 141,105,003,173,004,003,141,104
130 DATA 003,162,103,160,003,142,004,003
140 DATA 140,005,003,096,234,234,173,104
150 DATA 003,141,004,003,173,105,003,141
160 DATA 005,003,096,032,124,165,132,011
170 DATA 162,000,142,240,003,142,241,003
180 DATA 189,000,002,240,051,201,032,208
190 DATA 004,164,212,240,040,201,034,208
200 DATA 008,072,165,212,073,001,133,212
210 DATA 104,072,238,241,003,173,241,003
220 DATA 041,007,168,104,024,072,024,104
230 DATA 016,001,056,042,136,016,246,109
240 DATA 240,003,141,240,003,232,208,200
250 DATA 173,240,003,024,101,020,024,101
260 DATA 021,141,240,003,169,042,032,210
270 DATA 255,169,000,174,240,003,032,205
280 DATA 189,162,003,189,211,003,032,210
290 DATA 255,202,016,247,164,011,096,145
300 DATA 013,032,032
```

RUN AMOK

Our apologies to Ted Jean for omitting his name as co-author of "Arithme-Sketch" (June 1986, p. 66).

Listing 2. *128 Perfect Typist program.*

```
1 REM 40/80 COL 128 MODE PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17013
7 REM
10 FORX=5120TO5379:READD:T=T+D:POKEX,D:NEXT

20 IFT<>28312 THENPRINT"{2 CRSR DNs}ERROR I
   N DATA...":END
25 A$="":IFPEEK(215)=128THENA$="{20 SPACEs}
   "
30 PRINT"{SHFT CLR}"A$"{CRSR RT}**********
   **************************"
40 PRINTA$"{CRSR RT}** 128 PERFECT TYPIST I
   S NOW ACTIVE **"
50 PRINTA$"{CRSR RT}**{2 SPACEs}SYS 5120=ON
   {7 SPACEs}SYS 5150=OFF{2 SPACEs}**"
60 PRINTA$"{CRSR RT}**********************
   **************":SYS5120:NEW
5120 DATA 173,005,003,201,020,208,001,096,1
     41,045
5130 DATA 020,173,004,003,141,044,020,162,0
     43,160
5140 DATA 020,142,004,003,140,005,003,096,2
     34,234
5150 DATA 173,044,020,141,004,003,173,045,0
     20,141
5160 DATA 005,003,096,032,013,067,140,255,0
     19,162
5170 DATA 000,142,252,019,142,253,019,142,2
     54,019
5180 DATA 189,000,002,201,032,240,008,201,0
     48,144
5190 DATA 007,201,058,176,003,232,208,238,1
     89,000
5200 DATA 002,240,054,201,032,208,005,172,2
     54,019
5210 DATA 240,042,201,034,208,010,072,173,2
     54,019
5220 DATA 073,001,141,254,019,104,072,238,2
     53,019
5230 DATA 173,253,019,041,007,168,104,024,0
     72,024
5240 DATA 104,016,001,056,042,136,016,246,1
     09,252
5250 DATA 019,141,252,019,232,208,197,173,2
     52,019
5260 DATA 024,101,022,024,101,023,141,252,0
     19,169
5270 DATA 042,032,241,020,032,188,020,160,0
     02,185
5280 DATA 185,020,032,241,020,136,016,247,1
     65,116
5290 DATA 208,009,165,117,208,005,169,145,0
     32,241
5300 DATA 020,172,255,019,096,013,032,032,1
     62,000
5310 DATA 173,252,019,232,056,233,100,176,2
     50,105
5320 DATA 100,202,240,003,032,232,020,201,0
     10,176
5330 DATA 005,205,252,019,240,015,162,000,2
     32,056
5340 DATA 233,010,016,250,024,105,010,202,0
     32,232
5350 DATA 020,170,072,138,009,048,032,241,0
     20,104
5360 DATA 096,170,173,000,255,072,169,000,1
     41,000
5370 DATA 255,138,032,210,255,104,141,000,2
     55,096
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- **The Loan Arranger**—One of our personal money management features will be a loan calculator/amortization program to help you determine the interest you are (or will be) paying on loans. You'll want to add this program, for the C-64 and C-128, to your financial library.

- **More RUN Basic**—In June, July and August of last year, *RUN* published Basic 4.5, its own enhancement of Basic 2.0 that includes PET 4.0 commands, sprite graphics, music, windows and additional disk commands. Now we're adding more graphics capability, including turtle graphics, and commands to make structured programming easier.

- **Taking Screen Shots**—If you've ever wanted to photograph a computer screen but didn't know where to start, this article will answer all your questions. Soon you'll be snapping top-quality shots like a professional.

- **Introductory Turtle Graphics**—Regular turtle graphics is fine for children who can read, but how about the younger set? Our author has created a version that even pre-readers can use to draw their own pictures and write their own programs. It can also be useful for adults just starting to program.

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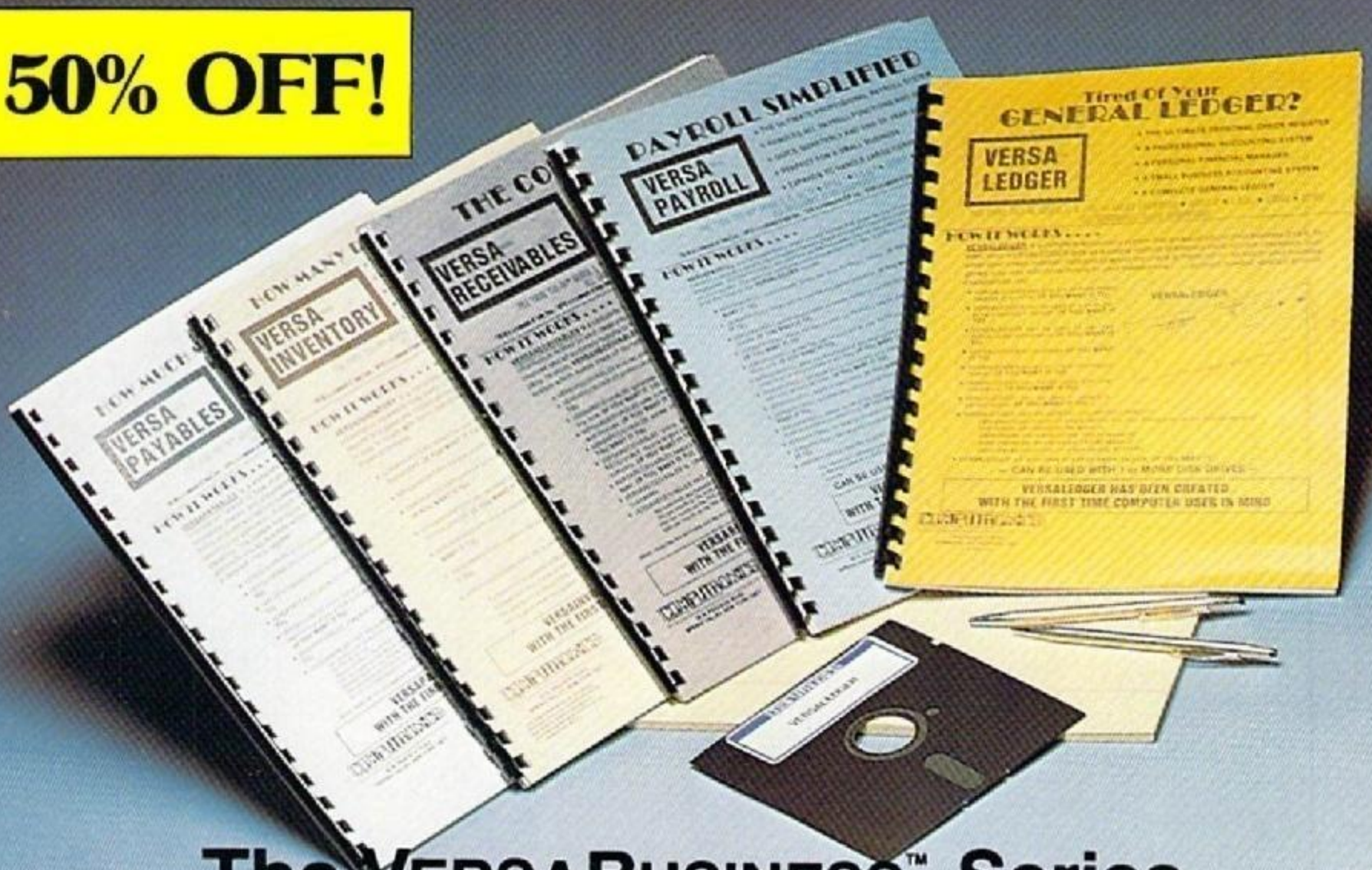

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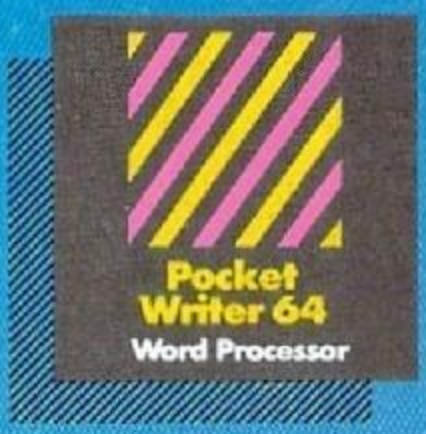

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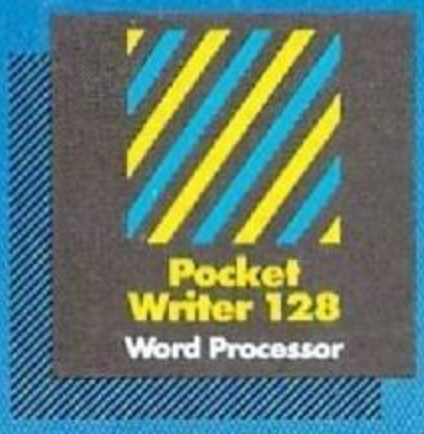

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